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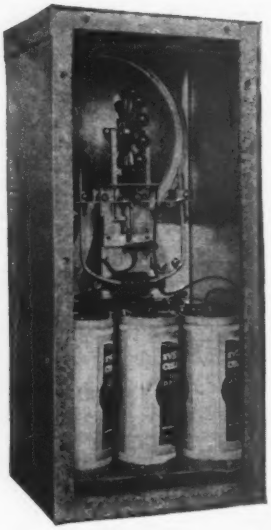

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DEVOTED TO CIVIL ENGINEERING AND CONTRACTING

F. E. SCHMITT, *Editor*

Volume 103 NEW YORK, JULY 18, 1929 Number 3

Sauce for the Goose

REGULATIONS of a state for the control of its citizens should unquestionably be observed by the state itself. Civilized ideals oppose special privilege, with no exception in the case of the body politic. Yet Indiana, by virtue of a ruling of its Attorney-General, holds that state buildings are exempt from the newly established requirement that plans for all major buildings must be prepared only by registered architects. This law, presumably, was passed in the interest of public safety. If it is true that only registered architects are qualified to design safe buildings, does not the state need their assistance? If, on the other hand, there are men without benefit of architecture who can be trusted to plan well and adequately, why is the regulation necessary at all? Building failures are the result of disregard of well-known laws of nature, and nature grants no diplomatic immunity to governments. The truth of this has been demonstrated in California, where a great disaster not long ago proved the peril of exempting dams built by municipalities from the precaution of review by a disinterested authority. Less tragic happenings elsewhere bear further testimony to the fact that mischance and error may take their toll from city or state as well as from private builders. No division of the government is justified in holding itself above regulations enacted for the safeguard of its citizens.

Real Facts Needed

ONCE more diametrically opposite views on the value of inland waterways have been expressed before a meeting of the American Society of Civil Engineers and have been permitted to remain neither proved nor disproved nor in any way reconciled. This highly unsatisfactory result comes about partly because of a lack of time and facilities for adequate discussion, but perhaps partly also because of chronic disinclination of members to enter into pointed discussion of controversial subjects. Such a state of affairs brings into question the value of these discussions to the members of the society. It even casts doubt on the value of the papers. College debating societies do more for their members than does the American Society of Civil Engineers, for they allow no important point to go unchallenged. Those who listened to the contradictory statements on waterways made at Milwaukee by responsible men came away more confused than ever. What better work could the society do than to set out to establish some definite facts concerning the economic value of our waterways? Let it print General Ashburn's and Mr. Hadley's papers and submit them to interested men on both sides; then, a year or so hence, invite the two authors again to state their views, when exposed to discussion by men who have had time to study the papers! Let it also lay a ban on so-called discussions which are simply added papers written by men who have not seen the papers they were supposed to discuss. Through improved procedure of this kind the society could eventually establish a valuable collection of data on important engineering questions.

Heavy Bridge Traffic

WHAT bridges over great waterways mean, from the standpoint of land traffic, is revealed in bright illumination by the figures of movement over the Delaware River bridge, given this week by J. K. Costello, general manager of the structure. The anticipated volume of traffic has been so greatly exceeded that net returns are almost double the expected returns—$6,800,000 against $3,800,000. Quite as significant is the fact that traffic increased by more than 15 per cent each year. Moreover, this result was attained against the handicap of lamentably bad approaches on the Philadelphia side. It will be recalled that in the early days of the Philadelphia project there were many pessimists who doubted whether the enterprise would be able to pay its way. They did not fully realize the strength of modern traffic growth; but also many of them felt about Camden somewhat as many old-fashioned New Yorkers feel about their city's New Jersey suburbs: that interconnection should be kept as inconvenient as possible for fear of choking the big city with undesired country-cousin traffic. Actually, the Delaware River bridge is progressing so fast that it may soon rival the Queensboro bridge over the East River in traffic volume, which means that it will be performing a function of metropolitan intercommunication. In the face of such a showing there is little room left for doubts about the future development of major bridge crossings.

Ditch Digging Advance

TWENTY years ago the drainage engineer drew his ditch sections as true trapezoids, but, using dipper dredges, he dug them to unshaped sections and somewhat random widths and depths, which in time, he hoped, when nature had finished caving the banks, would approximate his blueprint sections and dimensions. By doing this he obtained about the cheapest ditches per unit of pay excavation that have ever been produced. The dredge was dominant as a drainage ditching tool; no other excavator—and there were several that produced truly sloped and dimensioned ditches—could compete in cost. Because the dredge controlled the costs of ditching, the hydraulic element of drainage systems commonly departed from sane logic; laterals were made of a size which could be dug by dredges, and consequently of sizes which were often out of proportion to the main trunk ditches which received their flow. These practices were common to drainage work all through the Mississippi Valley, and indeed everywhere. They were the practices followed in constructing the drainage ditch system in Arkansas whose

rehabilitation is so excellently described in this issue and in a preceding article (*Engineering News-Record*, June 27, 1929, p. 1026). To the construction engineer it is perhaps the most significant feature of this great task of ditch reconstruction that the specifications enjoined contractors that "no floating equipment will be permitted." Since much of the new construction was necessitated by the original dredge construction, this was a natural restriction. An equal influence was the fact that other ditching equipment than the dredge was available which could dig better ditches at equal or lower cost per unit of pay dirt removed. The articles, in explaining the newer equipment and methods, present a notably good exposition of drainage ditching practice as it has been developed with dry-land excavators.

Earth Moving Abroad

EARTH-HANDLING equipment has taken a form in German engineering practice which is distinctive and quite different from anything in America. Dry excavation in large-volume operations in Germany is performed almost exclusively by continuous bucket excavators. These are enormous machines, running in the larger sizes to several hundred tons weight. On the spoilbanks or dumps, similarly large machines place the earth. In transporting the earth from excavator to spoilbank, train haulage is general, as it is in America, but the motive power is largely different because of the wide use of electric locomotives. These characteristic developments of German earth-moving equipment are of intense interest in contrast to the power shovels and the dragline and cableway excavators employed universally on this side of the ocean, and their description and discussion in the article in this issue on excavation and one to follow on transportation and disposal command careful attention. In particular the American engineer will find food for contemplation in the extreme neatness of excavation and disposal disclosed by the views of stripping operations in the German brown-coal fields. The orderliness of all things is marvelous and in decided contrast to most American earth handling to waste banks and dumps. Only in the Mississippi levee work (and here only in places) is there found in this country such precision of excavation and deposition. In a succeeding issue, with the data of the two articles by Mr. Krauth before the reader, the comparison of practice will be carried further. Incidentally, Mr. Krauth is an authority of the highest rank both from experience in earth-handling work and as a technical director in one of the largest equipment-manufacturing firms in Germany.

Heating Road Oil

OIL treatment of roads both to lay the dust and to produce a bituminous surfacing involves an expenditure in many road districts which calls for every expedient to insure economy in purchasing, preparing and distributing the protective material. In general the greatest technical obstacle lies in heating the oil in quantity to the high temperatures required for successful application. Where some millions of gallons a year of heavy and light oil are used intermittently, requiring not only separate unloading and storage but also different degrees of heating, separate means for loading to the distributors, and return of distributor surplus to storage, there is a handling, heating and temperature control operation of magnitude and complexity. The plant required is extensive, and at the same time it must be low in installation and heating cost and so simple as to require few operators if it is to keep within the cost limits required by bituminous oil treatment as a cheap surfacing and dressing for low-cost earth and gravel roads. The oil-heating plant described in this issue exhibits a notable effort to meet the complex and often contradictory requirements of a county highway department oil storage, heating and servicing plant. The notably small operating force is made possible by extra investment in plant planning. Fuel costs are kept down by the same means. Withal the plant investment is not beyond the resources of any county having a large road-oiling program. As a profitable county utility the plant insures the road users a gain beyond cheapness of operation by the ease with which proper oil temperature control, so important in treatment work particularly with the heavier oils, can be maintained. Where oil can be so readily returned to storage and reheated, there is no temptation to risk under-temperature application or to take chances with yesterday's "cold slugs" in the distributors.

Encouraging Signs

DEADENING monotony resulting from crowding too many long papers into a technical session has characterized the meetings of the American Society of Civil Engineers for some time. It appeared again at the Milwaukee meeting, last week, and overcame the endurance of all but a few of the members. Yet there were in evidence encouraging signs of a desire to get away from that aimless way of carrying on the society's work.

Heretofore the meeting programs have been made up with little attempt to concentrate on one point. Usually the three or four papers scheduled for one session have been so long and diffuse that, even though they dealt with related subjects, they made it impossible to develop definite conclusions, or even to sift out irrelevant facts sufficiently that at some later meeting the subject could be advanced measurably toward clarification. The general technical session at Milwaukee was a good example of such a meeting. Three papers on the subject of the relation of rail and water transportation, followed by two so-called discussions which were simply two more long papers giving added uncontroverted statements, kept the session sitting from 2 to 5:30 p.m. When, finally, the twenty-odd members who remained in the room insisted on adjourning, nothing had been accomplished. No facts had been established as a starting point for a subsequent discussion.

Opposed to this was the meeting of the highway division, where two fairly terse papers on the same subject, followed immediately by animated discussion, established a record which is to be used together with the record of three similar meetings held in other parts of the country as the basis of definite pronouncements on equitable distribution of motor vehicle fees and gasoline taxes. Here again, however, the unfortunate precedent of glutting the program could not be ignored, and one other paper—a very good one but on an entirely different subject—was scheduled, presented and soon forgotten by a tired audience.

Back of the occasional signs of a change in the conduct of meetings lies no small amount of effort on the part of the board of direction to make the work of the technical divisions more effective. What is needed now is a drastic pruning of programs and papers by both the division executive committees and the headquarters

staff. Aside from a small number of purely descriptive local papers, the programs should be so controlled in length and scope as to assure effective and animated discussion. It is better to have a session adjourn an hour after it assembles, if no discussion develops, than to suppress all possible discussion by too many papers.

Some of the technical divisions are finding their stride. They need much counsel and advice from their members and the board if they are to develop programs for their meeting which will materially increase their value as compared with their past aimlessness. The improved spirit and managerial skill which showed in a few spots of the Milwaukee proceedings should not be allowed to die for lack of cultivation.

Parallel Streets vs. Boulevards

ENOUGH opposition to superhighways has developed, and there is enough engineering and economic reason for that opposition, to make it timely for over-enthusiastic advocates of double-width boulevards to pause a bit before trying to extend them too far into farm territory. Multiplication of numerous arteries out of cities with no physical restriction—the usual case—is one thing; it is quite another thing to provide the wide roadways where only one or two locations are possible for outlets, as is the case in peninsular cities like New York and San Francisco.

Small merchants on the 108-ft. Woodward Avenue leading out of Detroit with its fan-shape development of arteries are said to feel that the extra width has ruined their business. As a local business street it is not so desirable now as it was when narrower. A boulevard 108 ft. across becomes decidedly a one-side business street, for the width discourages pedestrians from crossing. Property owners along the widened Ogden Avenue in Chicago are complaining bitterly that the street is ruined from the business standpoint. The excuse which the Chicago Plan Commission gives for the unsettled condition is that Ogden Avenue is not yet completed. A second parallel street or road was perhaps possible in the case of Detroit; it was hardly possible in the case of Ogden Avenue. Where it is possible, it is an alternative that should be considered.

From the traffic standpoint not every engineer feels that the wide road is the answer to traffic congestion and accident prevention. It is significant that in the recent annual report of Harry T. Kirk, Ohio state highway director, the construction of parallel highways in place of superhighways is recommended, with a view to reducing highway accidents. While the Chicago Regional Planning Association has been instrumental in obtaining 100-ft. and 80-ft. rights-of-way on 500 miles of section and half-section line roads in newly subdivided lands, it has also consistently stood for completing as soon as possible the links in the parallel highways. Once these are completed and traffic is allowed to go freely to its destination, traffic surveys will begin to mean something and can be depended upon to indicate the capacities required.

In the preliminary studies of the West Chicago Park Commission for an 8½-mile elevated highway from the Loop to the western city limits a narrow structure that can be built at once on the existing street width is being given serious consideration, as an alternative to widening the present street. Elimination of grade crossings with the stop-and-go nuisance, combined with no-parking rules, is held to be sufficient to produce a high-speed, high-capacity trafficway. Further, the usual eight to ten years of time needed to acquire property for a widened structure, to say nothing of the high cost (trebled in this case) of purchasing fully developed property, makes the use of the narrower existing street widths highly desirable for those who want immediate relief.

Fuller utilization of existing widths of right-of-way in conjunction with parallel streets and in double-decking should not be overlooked. No doubt we must have wide boulevards, but they are so expensive in first cost and per unit annually and it takes so much time to acquire them that for immediate relief we must in many cases look to attaining higher efficiency on a greater number of narrower roads. Neither can pedestrian traffic and the interests of property owners be wholly ignored. There is room for both types of development. Only after a most careful balance has been drawn between more intensive utilization of the narrower street and immediate widening to boulevard proportions should decisions be made.

Structural Welding Assurance

IN DRAFTING a code for structural welding, the American Welding Society has performed an outstanding service for the engineering profession as well as for welding itself. The engineer who has been called upon to design a welded structure has been involved in serious doubts because of a lack of guiding specifications. The guesswork to which he had to resort created a potentially dangerous condition for welding progress.

It is a criterion of modern engineering that such dangers as this are combated not by closely guarding all information as did the old-time craftsmen's guilds but by making it universally available. This practice, on the part of advocates of special engineering methods, of early codification of data and constant elaboration and study by research is apparently growing. Such information is increasingly necessary and whenever provided is welcome indeed.

The new code is brief, but it supplements brevity by reference to the more voluminous data compiled by the structural steel welding committee. It sticks to fundamentals, and quite definitely delegates the task of providing safe and economic structures to the judgment of competent engineers. Perhaps some of the "shall" clauses in its section on design might better have been tempered by the substitution of one or two acceptable methods. Also, it is not clear why the code is confined so rigidly to buildings, although a bridge code may have been regarded as premature in view of our limited knowledge of how welded joints act under impact. But by and large the framers have succeeded in developing an authoritative and impartial code that should prove of great value.

At the same time, having created a code which relies upon competent engineers to carry it out, the society has assumed an obligation to insure the proper development of such men by providing them with interpretation of all data on tests and practice as they become available. One of the first tasks would seem to be the enlargement to actual job proportions and needs of the test specimen data already compiled by the structural steel welding committee. With the new code available, and with a continuing research program going on, structural engineers can now look on welding with increased confidence that they will be able to make proper and safe application of its possibilities.

First of Two Articles

Large-Volume Earth-Handling Equipment in Germany

By Th. Krauth
Technical Director, B. Wittkop, Aktiengesellschaft für Tiefbau, Berlin, Germany

Excavating Equipment and Methods

Continuous Bucket Excavators Developed to Enormous Size and Capacity for Canal Construction and Brown-Coal Mine Stripping Operations Amounting to Quarter Billion Cubic Yards Annually

German Engineers have developed distinctive types of excavators for large-yardage earth-moving operations. In mine stripping, which amounts to an enormous volume yearly, as well as in canal and dam construction and other major tasks of earth handling, the material is excavated and loaded by continuous bucket excavators. These machines are built to enormous sizes, some of them weighing 550 tons and digging to a depth of 100 ft. The contrast in type between these machines and the power shovel, the dragline excavator and the cableway excavator, universally used in America for similar operations, gives great interest to this account of German bucket-excavator earth-moving practice. —Editor.

REMARKABLY high development of earth-moving methods and equipment in Germany has been achieved in the brown-coal mines. In operating these mines about 250,000,000 cu.yd. of overburden is excavated, transported and wasted each year. These enormous stripping operations have developed since 1914, or virtually with and since the World War. The German practices are the product of the enormous economic pressures of this period. The usual operations of railway and canal construction could not have forced so rapid an improvement of equipment and methods. Coal-stripping practice, therefore, has an important place in any consideration of German earth-handling machinery.

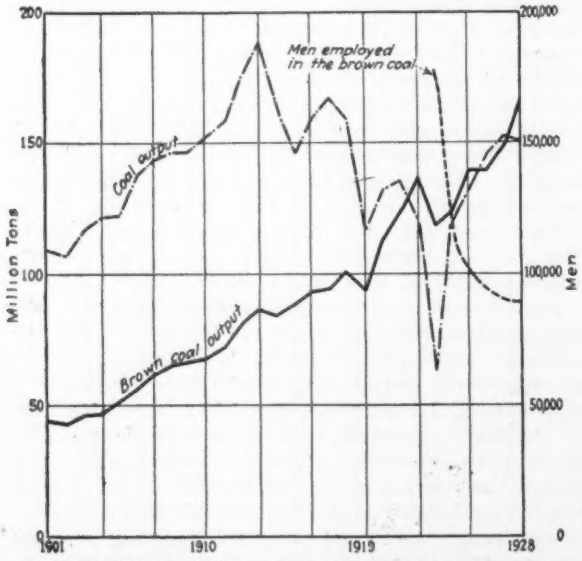


FIG. 1—COAL AND LIGNITE OUTPUT IN GERMANY
Note rise in brown-coal (lignite) output with simultaneous drop in men employed due to greater mechanization.

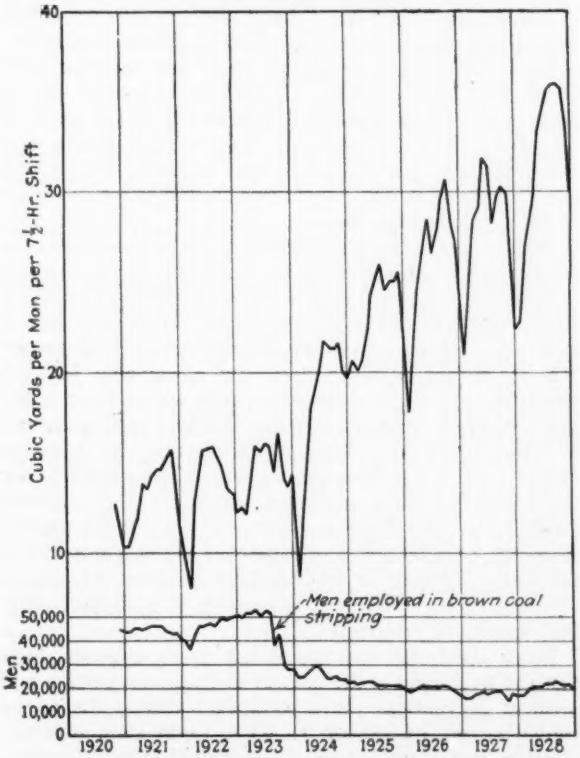


FIG. 2—INCREASE IN BROWN-COAL OUTPUT PER EMPLOYEE, 1920-28
In general, number of employees cut in half and output per man per 7½-hour shift doubled.

Because of the decrease in coal output due to labor shortage, Germany during the war was forced to increase the output of her more easily worked lignite mines. These are open mines, and the controlling cost factor in their operation is stripping. The task before engineers was, therefore, to reduce the cost of stripping as well as to increase fuel output. The course of development is indicated by Fig. 1. Up to the war the coal output was normally double that of lignite. Then the coal tonnage began to drop and the lignite tonnage to rise. These trends continued until after the war, when coal mining began to recover. To meet this competi-

TABLE I—EXCAVATORS WITH TRUCKS ELECTRICALLY OPERATED

Type (Manufacturers' Designation)	E III*	F VI	NE I*	ND I*	T.G.*
1. Excavating depth at 45 deg., yd.	15.4	15.4	21.9	20.8	32.8
2. Bucket capacity, cu.ft.	2.05	10.6	10.6	17.6	26.5
3. Buckets emptying per minute	25	25	25	25	25
4. Theoretical output, cu.ft. per hour	10,600	15,900	15,900	28,500	28,500
5. Possible output, cu.yd. per hour in cars:					
(a) Light soil, buckets ¾ full	7,920	11,800	11,800	19,800	21,500
(b) Medium soil, buckets ½ full	7,050	10,600	10,600	17,700	19,100
(c) Heavy soil (clay), buckets ½ full	5,000	7,920	7,920	13,200	14,300
6. Average power, kw.	80	125	185	280	420
7. Total working weight, tons	102	150	255	298	550

Notes—Attendance for all machines is one foreman, one man at trapdoor and one man lubricating. A bucket is attached at every fourth pair of chain links. First three machines have single-dumping device, last two machines have double-dumping device. *Illustrated diagrammatically in Fig. 3.

TABLE II—EXCAVATORS WITH CRAWLER TRACTIONS

Type (Manufacturers' Designation)	R O	R II	R IV	R VI	R VIII*
1. Excavating depth at 45 deg., yd.	4.9	7.1	8.8	13.2	15.4
2. Bucket capacity, cu.ft.	0.53	1.77	3.54	7.1	10.6
3. Buckets emptying per minute	30	30	30	30	30
4. Theoretical output, cu.yd. per hr.	35.3	118	23.5	4.70	710
5. Possible output, cu.yd. per hour in cars:					
(a) Light soil, buckets ¾ full	26	89	176	353	530
(b) Medium soil, buckets ½ full	23.5	79	157	315	470
(c) Heavy soil (clay), buckets ½ full	17.7	59	118	235	353
6. Gross weight, electric power, tons	17.3	31.5	88.5	163	277
7. Gross weight, diesel power, tons	18.3	32	92	....	....
8. Conveyor added weight, tons	2	4	8	13	15
9. Conveyor, length, yd.	4.4	6.6	16.4	11	16.4

Notes—A bucket is attached at every fourth pair of chain links. One foreman and one man at trap door operates types RO, R II and R IV; one foreman, one man at trap and one man lubricating operates types R VI and R VIII.

tion, the lignite mines had to resort to increased mechanization of stripping operations. The result is indicated in Fig. 1 by the curve showing the decrease in men employed despite the increase in output.

A more graphic picture is presented by the curve of Fig. 2. In 1928 the output per man per shift of 7½ hours was 2½ times that of 1923. These curves are averages of all mines, including a number of small operations without the most modern equipment. In the larger and better equipped mines the yardage output per employee (including those in shop and auxiliary operations) runs from 40 to 50 cu.yd. and up to 65 cu.yd. For comparison, in straight construction the average output has rarely exceeded 35 cu.yd.

In the beginning mine stripping took its practice and equipment from construction. Railway and canal con-

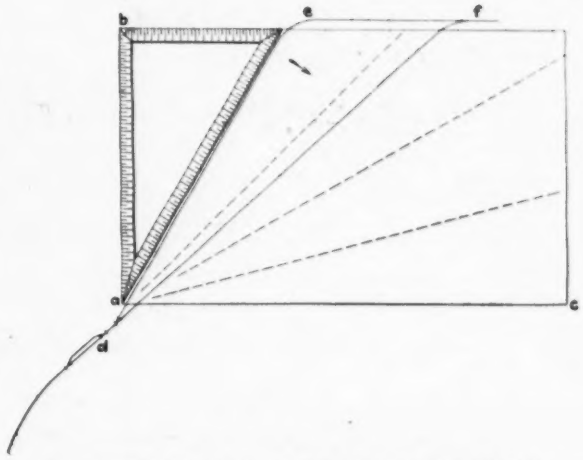


FIG. 4—GRAPH OF OPERATING PLAN FOR LARGE-AREA EXCAVATION

tractors twenty years ago, seeking more continuous work for their outfits, turned to the brown-coal mines. This had much to do with making the mines profitable. In brief the general earth mover helped brown-coal mining to reach its present high development, and during a period when contracts for harbor and canal work were lacking the brown-coal mining trained him to develop methods and machines that can be used to advantage in the revival of civil engineering construction.

The situation is this: At the beginning of the war the largest bucket excavators in use had a working depth of 35 to 40 ft. and a working weight of 70 to 100 tons. Sooner greater depths of excavation were demanded as the fields with shallow covering became worked out. Gradually the equipment was increased in size to meet the demand. Without at the moment going specifically into sizes, let it be said that whereas formerly open mining paid only when the ratio of overburden to seam thickness was about 1 to 1, it is now profitable to work mines where the ratio is 3 to 1 and sometimes even 4 to 1.

So much for the background of present-day methods and equipment for large-volume earth moving in Germany. For consideration in detail they will be classified under excavation, haulage and placing.

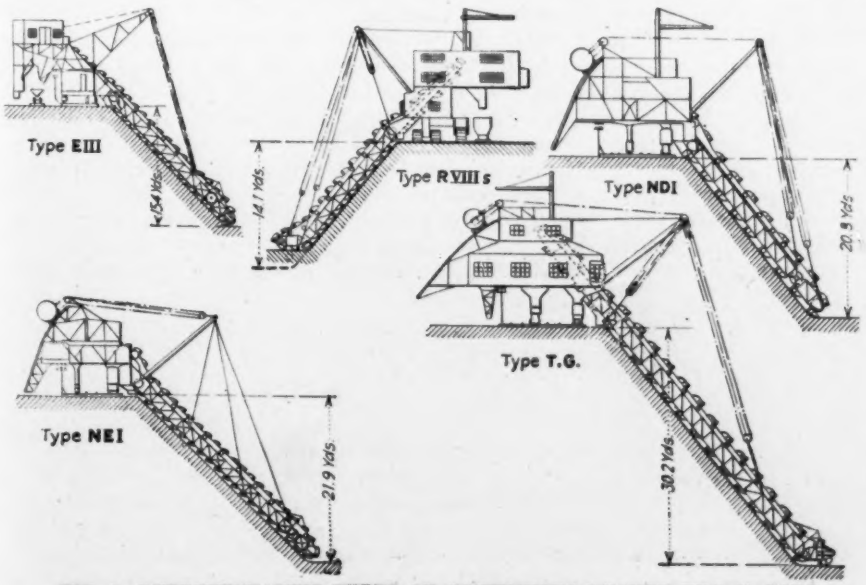


FIG. 3—REPRESENTATIVE TYPES OF CONTINUOUS BUCKET EXCAVATORS
Usually these machines are electrically operated, but diesel engine power is also common. See Tables I and II.

Excavating Equipment

The ruling equipment for large-volume earth excavation is the multiple-bucket excavator traveling on rails — or lately to a small extent on crawlers. These machines have guided bucket chains; loose chains are rarely seen. The power shovel, the universal machine in America, is used in Germany mainly for small-volume operations, though it is also found on large jobs as auxiliary equipment to remove the surface soil, prepare trackways for the large multiple-bucket machines, clean up bank slides and take out parts not removed by the bucket excavator.

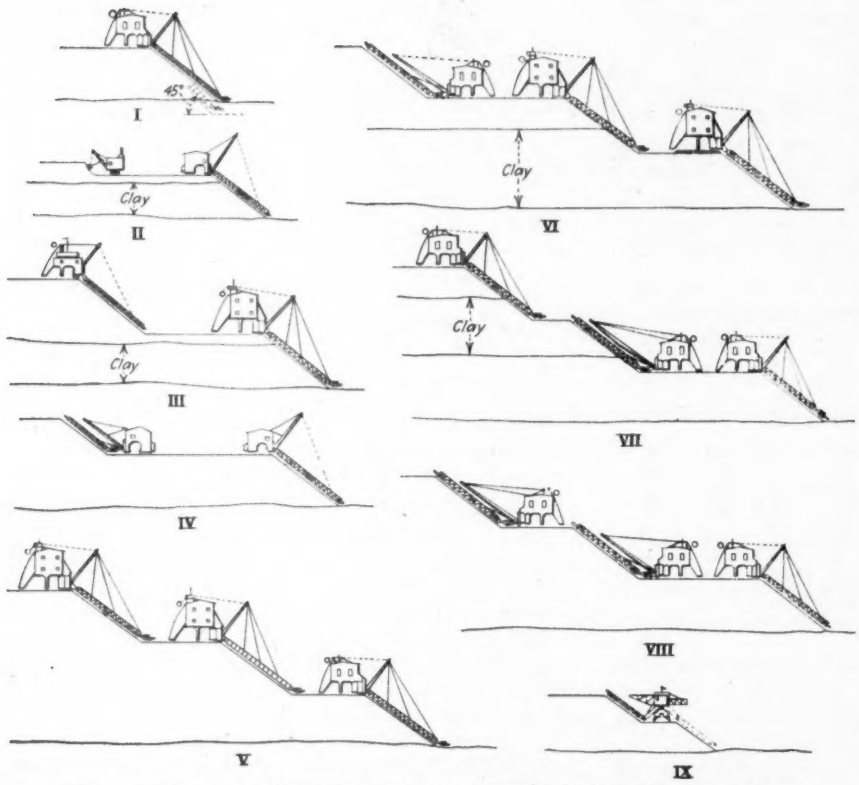


FIG. 5—EXCAVATOR ARRANGEMENTS FOR CUTS IN ONE AND TWO LIFTS

(I) Surface uneven, earth can be taken with one excavator cut. (II) Surface uneven, a shovel constructs a roadway for the bucket excavator. (III) Covering so thick that two cuts are neccessary; surface even, therefore two down cuts. (IV) Covering as above but with down cut owing to the uneven nature of surface. (V-VIII) Covering so thick that three cuts are necessary. The upper cuts in VI and VIII are down cuts owing to uneven surface. The second cut in VII is a down cut, so that the machine has a good bearing ground. In general the cuts are taken as down or trench cuts, depending on which way the material has to be transported, to avoid unnecessary inclines. (IX) Illustrates an excavator capable of rotating through 360 deg., which can be used both for down or trench cutting; only to be used on ground of good bearing value.

Bucket Excavators—The bucket excavators range in capacity from ½ to 3 cu.yd. The range of dimensions and capacities of the latest and largest machines of the Lübecker Maschinenbaugesellschaft is indicated by Tables I and II; and the machines indicated by asterisk in the tables are shown diagrammatically in Fig. 3. This group of illustrations visualizes very clearly the predominating characteristics of the ruling equipment employed in Germany for large-volume earth moving.

Speaking in general of these machines, it would appear that further improvements are hardly possible except for changes which may result from experience gained with excavators on crawler tractions. Should these prove widely successful, the elimination of railway tracks and their expensive upkeep will further reduce costs.

Capacity and Power—Tables I and II give nominal values of capacity and power. In general, capacity is indicated by bucket size. The upper limit for economic operation, however, should be put at about 1 cu.yd. bucket size. The cutting depth is determined by the nature of the soil. In general, with cuts over 40 ft. the depth should not exceed three-fourths to four-fifths the reach of the ladder at an angle of 45 deg. or there will be danger of overturning the machine by slides. It is possible to lengthen the ladder by using smaller buckets and wider spacing, but of course at the expense of output.

Steam power, largely used a few years ago, is giving way to electric power. Electric power distribution is now so wide and current can be had at such nominal prices that electric machines predominate. The current required is 500 volt alternating. The high-tension wires are led to the excavation site and there transformers on the machine (or transformer stations on the bank) reduce the current to the voltage desired.

The manner of operating bucket excavators is best shown by considering: (1) the excavation of a large area such as the stripping of a coalfield or opening a sand, gravel or borrowpit; and (2) the excavation of a canal such as the Mittelland Canal at present under construction in Germany.

Wide-Area Operation—In wide-area operations the work should be so planned that the railways for transporting the excavated material, the water-supply installations, the transformer stations and the shops and other service buildings need to be moved only infrequently. If possible, therefore, the area is covered radially about a fixed point as indicated in diagram, Fig. 4. If a single-portal excavator is used, the empty train must wait on the siding *d* for the loaded train, and the excavator waits while the loaded train pulls out and the

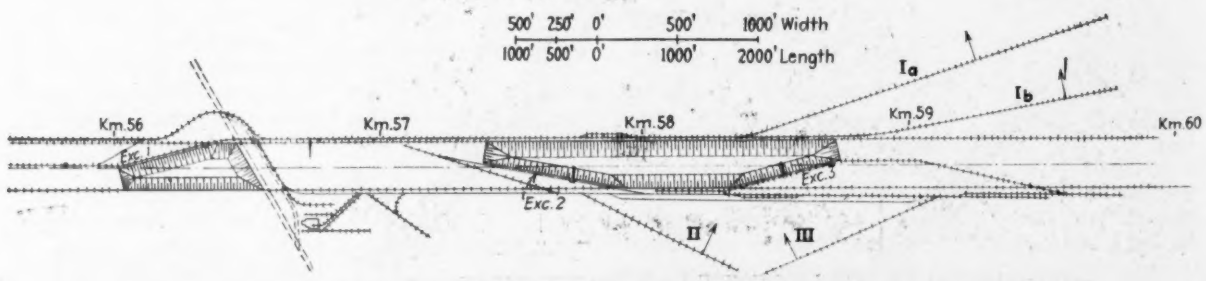


FIG. 6—AN OPERATING PLAN FOR CANAL EXCAVATION

This 3-mile section varies in depth of cut from 39¼ to 72 ft., requiring both one-lift and two-lift operations.

empty train backs in. This delay can be reduced by introducing a loop track *aefd*, but such a track has the disadvantage of more maintenance and of continually shifting the curve at *e*. A double-portal excavator eliminates both the delay and the loop track, but the output required has of course first to warrant the heavier and more costly machine. Larger areas that, owing to the excessive excavator travel, cannot be worked from one radial center point have to be subdivided into several parts as the occasion demands.

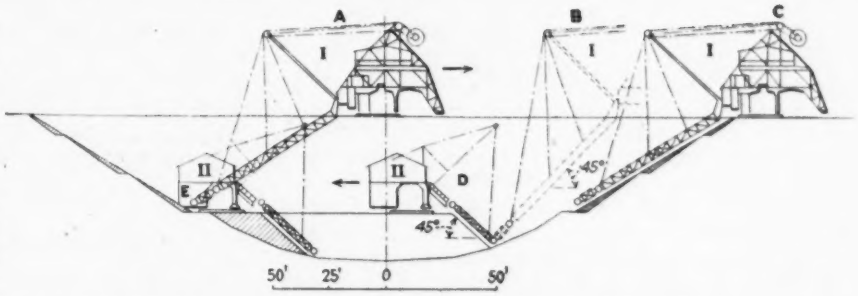


FIG. 7—CANAL SECTION SHOWING PROCEDURE IN TWO-LIFT EXCAVATION
In this case two lifts were dictated by fear of slides if a single-steep-bank cut were made by excavator I. The hatched areas indicate section of prism not handled by the bucket excavators.

Where the overburden is too thick to be removed in one cut, the process is to operate two or more machines, each taking out a lift. The diagrams of Fig. 5 indicate multiple-machine operating arrangements. A fact to be noted is that the excavators will make either a lifting cut or a down cut simply by changing the ladder arrangement and rigging. The down cut is particularly serviceable where the ground surface is irregular. The excavators require an even trackway surface and where the ground is uneven this must be provided by a down cut or by a separate grading excavator as indicated by Fig. 5, II. The trackway surface also if of soft material must be filled and graded with firm material; the excavator requires a hard foundation on which to operate. With several lifts particularly, but also in any case, the cuts should be so arranged that the haul is downgrade to the waste dump.

Long Narrow Operations—Fig. 6 shows the working method in canal excavation. The portion under construction is about 3 miles long and has the cross-section shown by Fig. 7. Three excavators are operated thus: No. 1 works from km. 56.5 west and Nos. 2 and 3 starting together at km. 58 work away from each other. Only single-portal excavators being available, the track system shown by Fig. 6 was adopted to reduce excavator delays waiting for trains. Soil conditions made two dumps I*a* and I*b*, advisable for excavator No. 1; dumps II and III serve excavators Nos. 2 and 3. All four dumps were served by one leveling plow.

The depth of canal cut varied from 72 ft. at the west end to 39½ ft. at the east end. Excavator 3 could therefore dig the full depth in one cut. The section covered by excavator 1 and the western part of the section covered by excavator 2 required two lifts and a second excavator in each case for the bottom cut. Fig. 7 indicates the method of double-lift excavation. The upper excavator I had great enough ladder length to cut to full depth, but the soil could not be depended on to stand on 45 deg. or steeper slopes (position *B*, Fig. 7). The plan therefore was to make a cut to towpath level across the canal with excavator I proceeding from *A* to *C*, Fig. 7. The second cut was then made by excavator II proceeding from *D* to *E*. Excavator II could cut to 40 ft. with the ladder at 45 deg. To make the shallower cut and take out all of the cut prism possible the ladder was shortened. The cross-hatched areas show all of the prism remaining to be excavated after the two excavators had finished. This remainder of earth was taken out by power shovel. Cleaning and trimming were by hand. A view of excavator I making the first cut is shown by Fig. 8. Fig. 10 shows a two-lift operation with the latest type double portal excavators. These machines are of the type NDI in Table I.

In canal excavation, owing to the fact that the earth always must be raised to surface level, a multiple bucket excavator is always to be preferred to power shovels and especially in case of much water and a clayey soil. To obtain the same output as with bucket excavators, several power shovels in several cuts must be employed. An extensive track system is required to take shovel excavation out of the cut. This involves expensive shifting and reconstruction, upkeep and final removal. Shovel moving on bad ground is another trouble. The haul out of cut is always uphill. These objections do not prevail with bucket excavators. Finally, the bucket excavator gives fuller carloads and does not overstrain the cars in loading.

FIG. 8—EXCAVATOR MAKING TOP CUT IN CANAL EXCAVATION
This is a view of excavator I in Fig. 7. Observe the even cut slope and bottom left by the excavator.

The economical limit of excavator travel along the

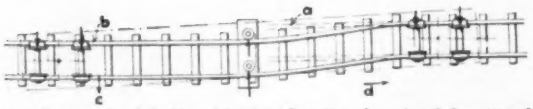


FIG. 9—OPERATION OF TRACK-SHIFTING MACHINE

cut face with a single-portal excavator is determined by the time waiting for trains. It may be put at 1,650 ft. Considering the difficulty of maintaining a long excavator track, one will seldom go beyond 3,000 or 3,300 in case of a double-portal excavator. The excavator track must be shifted back from the cut every two or three days according to the length of excavator travel and the excavator output.

Track Shifting—Quite recently track shifting was still by hand and took a gang of 50 to 80 men the best part of a working shift, which was lost time for the excavator. At present few efficiently handled operations are without mechanical trackmovers. The machine commonly used consists of a steel truss span of 50 to 60 ft. supported at the ends on two four-wheel swiveling trucks. The span carries at the center a roller frame capable of transverse and vertical movement; the rollers have flanges which clasp the rails. The operation is indicated by Fig. 9.

With the span set as indicated, the rollers are lowered to clasp the rails and then are raised to lift the track from the ground. The rollers are then shifted laterally, swinging the raised track sidewise. The track mover is then pulled ahead by its own power or by locomotive, the track being lifted and threaded through the rollers as the machine advances, with the forward truck riding on the unmoved track and the rear truck on the moved track. In effect the machine lifts and swings the track in a progressive wave, which has a height of 4 to 6 in. and a transverse travel of about the same distance. The speed of the machine is from 7 to 14 ft. a second. Repeated trips shift the track any lateral distance desired. The machine travels anywhere on the track system and goes through the portals of the excavator so that it can be used to shift track for several excavators or on the dump. It does almost no damage to the track.

The second article by Dr. Krauth describing hauling and placing equipment and methods will be published next week.

Locomotives for 4 Per Cent Grades

For the long heavy grades and almost continuous curvature of the Kalka-Simla Railway, in India, new tank locomotives have been built with unusual flexibility of wheelbase. The boiler, with side and rear tanks, is mounted on two six-wheel steam trucks, each track having at each end a radial pony truck, giving a 2-6-2-2-6-2 wheel arrangement. The firebox drops between the two sets of trucks. This railway, of 30-in. gage, is 60 miles long, with a rise of 4,727 ft., from 2,143 ft. above sea level at Kalka, the main line connection, to 6,870 ft. at Simla. Its maximum grades are 4 per cent, the longest of which is practically continuous for 24 miles, while the sharpest curves are of nearly 48 deg., or 120-ft. radius. The new engines weigh 68 tons, with 24 tons on each group of 30-in. driving wheels, or an average of 8 tons per axle. Each group has a wheelbase of 6 ft., or 15 ft. including the radial trucks, the total wheelbase being 44 ft. 10 in., and the total length of engine 68½ ft. The cylinders are 13½x14 in. A rear bunker carries 3 tons of coal, while the side and rear tanks have a combined capacity of 1,350 gal. of water. These engines built by Kitson & Company, Leeds, England, are designed to take 160-ton train loads up the 4 per cent grades at 10 m.p.h. An American articulated tank locomotive of the 2-6-6-2 Mallet type for hauling 145 tons up a 6-mile grade of 7½ per cent on the 3-ft. gage line of the Uintah Railway, in Utah, was described in *Engineering News-Record* of Aug. 4, 1927, p. 190.

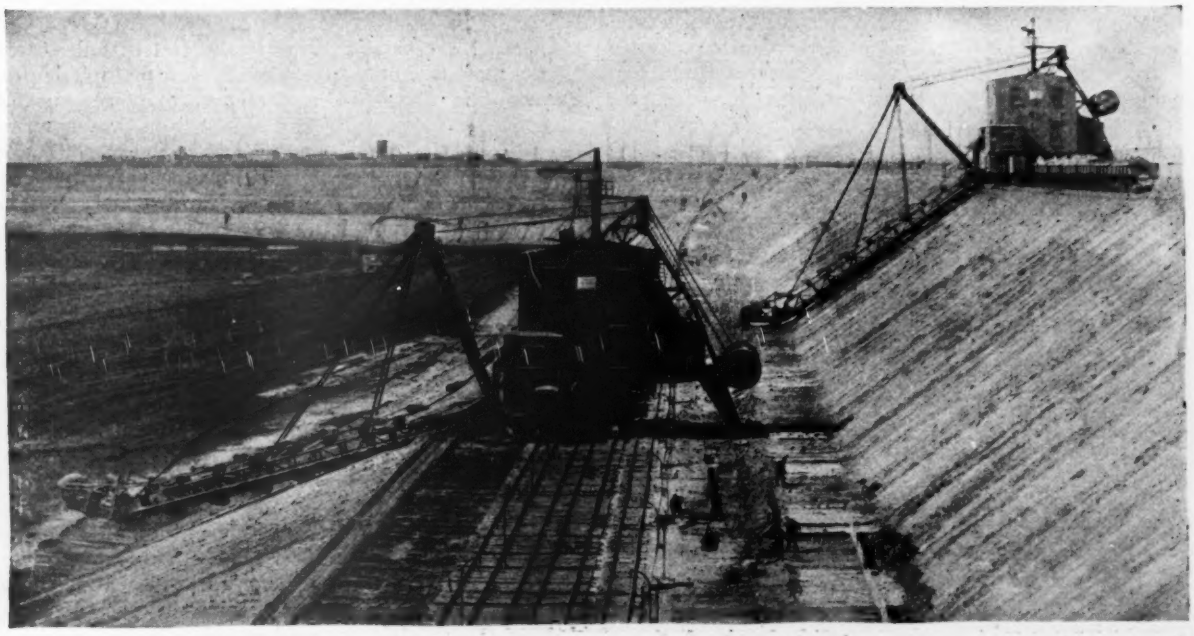


FIG. 10—TWO EXCAVATORS MAKING DOUBLE-LIFT CUT
This is a stripping operation. Note the even slopes and floors, the track arrangement and the gooseneck portable trolley poles for electric spoil train operation.

Southern Pacific's New Freight Yard at Fresno

Ultimate Capacity Will Be 2,400 Cars and Repair Tracks Will Be Increased to Accommodate 185 Cars

TO PROVIDE adequate facilities for its increasing railroad business at Fresno, Calif., the Southern Pacific Company has established a new freight yard 4 miles north of the city, as the old yard was too small and switching operations were hampered by many street crossings. About 1,400 cars are handled daily as an average, with a maximum of 2,200 cars.

The first unit, now completed and containing 23½ miles of track, includes the train yard, a 150-ton track scale, car repair tracks, water and fuel-oil supply for locomotives, a floodlighting system and a car-icing plant.

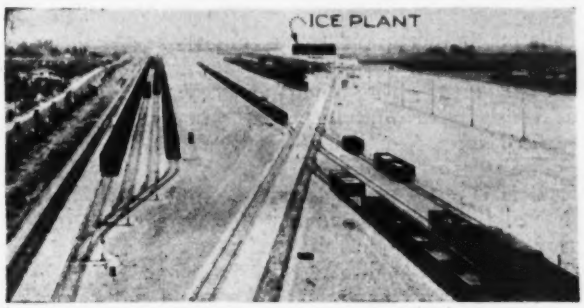


FIG. 1—FREIGHT YARD AT FRESNO, CALIF.
First stage of construction. Main track at left. Ladder track and running track to icing station in middle. Repair tracks at right. Track scale on middle track. Additional yard tracks to be built as required.

The present body tracks of the main yard have capacity for 1,400 cars, while the ultimate capacity will be 2,400 cars on tracks holding 50 to 121 cars each. Car repair tracks now accommodating 45 cars will be increased to a capacity for 185 cars as required. Future work will include additional body tracks in the train yard, two engine houses, a machine shop and a storage yard for 440 cars, together with the miscellaneous facilities of a modern freight yard.

In the view, Fig. 1, looking north, the main track is at the left, parallel with the four body tracks, each of 121 cars capacity, and with a middle track on which the track scale is placed. Of the two diagonal tracks, one is a ladder serving a group of body tracks along the opposite side of the yard; the other is a running track to the icing station. At the right are the present repair tracks, beyond which will be the engine terminal. Fig. 2 shows the present layout and the ultimate development under the approved plan, which provides for the extension systematically from year to year.

This yard is for flat switching and has one main group of tracks serving for receiving, classification and departure purposes. Trains of refrigerator cars can be moved to the icing platform, which accommodates 75 cars on each side, while provision is made for platforms and tracks so that four 100-car trains can be handled at one time. At present the icing plant, which is owned and operated by the Pacific Fruit Express Company, can ice 150 cars at once at an average rate of one car per minute. It has a daily production capacity of 600 tons of ice and a seasonal storage capacity of 40,000 tons. The buildings are of reinforced concrete; the day storage structure is 75x150 ft., and the seasonal storage building, or ice house, 150x200 ft.; the latter is 60 ft. high. Ice is delivered to the icing platform by inclines and bridges.

Double track is provided between the yard and the city to expedite the movement of freight and passenger trains. In the site for the yard, 2 miles long and 650 ft. wide, there are no highway crossings, as by agreement with the county a new road was built along the east side and all crossroads were abandoned. Grading for the yard site amounted to 239,000 cu.yd., much of which was in hardpan, with a maximum of 8-ft. depth in cuts and 5-ft. height of fill. Tracks are laid with 90-lb. rails on creosoted ties in gravel ballast. Turnouts have frogs not less than No. 9.

This yard was designed and built under the direction of W. H. Kirkbride, engineer of maintenance-of-way and structures, Southern Pacific Company. Approximately $2,000,000 has been spent on the first unit now in operation.

Motor Equipment Collects Rubbish

In the removal of ashes and rubbish at Cincinnati, progress was made during 1928 toward the use of motor equipment. According to the annual report of Fred Maag, superintendent of waste collection, two trailer units are now in operation, each consisting of eight trailers, one large truck-tractor and two small tractors. Both horses and tractors were tried at the time the first trailer unit was installed in 1927, and while horses were satisfactory on level stretches, tractors operated more satisfactorily on hills. An electric tractor used in conjunction with the trailers "is proving satisfactory and seems to be an improvement over the gasoline vehicle." The most notable improvement in the territory covered by the trailers is the collection of ashes and rubbish from the rear door, instead of from the property line. Not only has the service been improved by the use of the trailer units but costs have been lowered to 0.739c. per cubic yard for 1928, against 0.813 for 1927, a decrease of 9 per cent. Six large motor trucks make collections in the outlying residential sections of the city. By the use of trucks and trailer units the so-called residential dumps have been abandoned. Dumping is concentrated in a few major places, most of them being on city property, the filling of which will enhance the value.

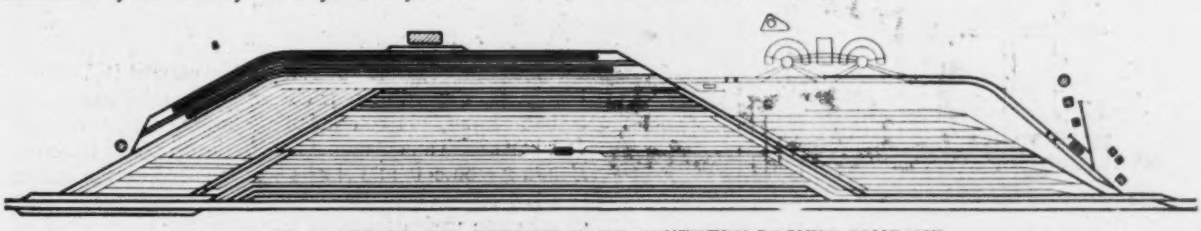


FIG. 2—LAYOUT FOR FREIGHT YARD, SOUTHERN PACIFIC COMPANY
Heavy lines show present facilities. Light lines indicate future development. Plan not drawn to scale.

Design of Capitol Dome at Olympia, Wash.

Unusual Foundation Conditions Require Use of Heavily Reinforced-Concrete Mat—Upper Dome 225 Ft. Above Foundations

By David C. Coyle
Gunvald Aus Company, New York City

STRUCTURALLY, the new legislative building of the State Capitol group at Olympia, Wash., is interesting because of unique foundation conditions and numerous details in the structure supporting the dome. A cross-section of the structure is shown in Fig. 3, as are also several details of its support. The rotunda is 175 ft. high inside and is covered by a ceiling dome of brick and an outer masonry dome, with an intermediate cone which carries the masonry lantern. The lantern floor is 225 ft. above the foundations, and the top of the lantern about 50 ft. higher. The outer dome has a span of 74 ft. inside. Since all of the upper work is of solid masonry, the supports have to be substantial, and the resulting load on the foundations is rather heavy. Up to a height of about 75 ft. this central structure is buttressed by the Senate and House wings on the east and west and by deep porticos and entrance halls on the north and south, which take the thrust of the four main arches under the dome.

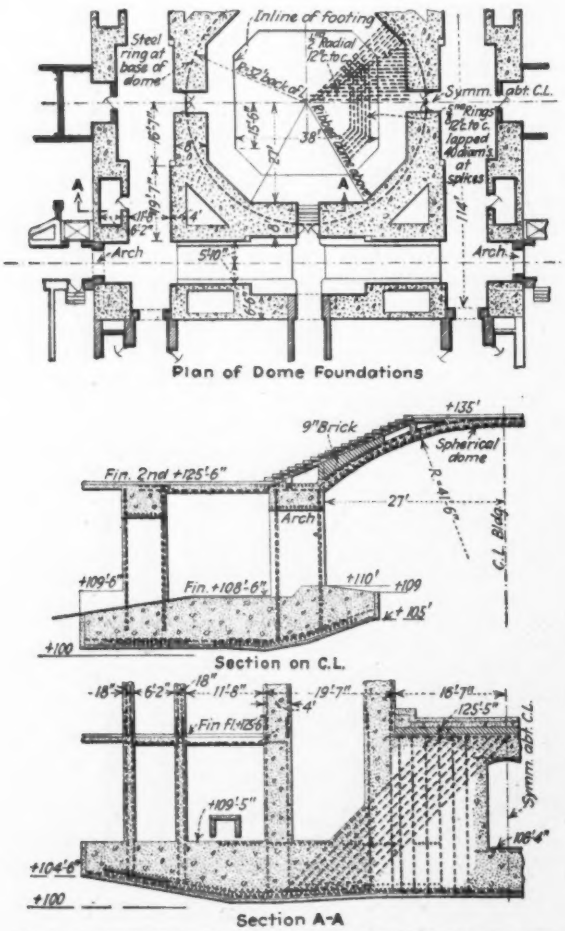


FIG. 1—FOUNDATION DETAILS, WASHINGTON STATE CAPITOL

FIG. 2—PLACING REINFORCING STEEL IN FOUNDATION MAT FOR WASHINGTON STATE CAPITOL
The concrete construction shown consists of a 6-in. floor and 8-in. surrounding walls placed as a protection against water. This picture was taken shortly after a heavy rain. The resultant water can be plainly seen.

Foundations—The foundations presented a problem of considerable difficulty. The group of buildings is situated on top of a hill rising sharply from Puget Sound to a height of about 110 ft. The center of the rotunda is about 650 ft. from the shore line. Borings showed the hill to be composed of irregular strata of sand, yellow clay, blue clay and mixtures, all very firm and with no groundwater to a depth of nearly 100 ft. There are many lenses and no stratum can be clearly followed for any great distance. Where a sequence of strata appears in two or three consecutive boreholes the relative thickness is very different.

On such a site the choice could be only between a spread footing and concrete piles. Tests showed that 4 tons per square foot could be safely carried on each of the different materials which come to the surface within the site of the building. The material is too stiff to permit driving piles to a great depth except by jetting, which process seemed a gratuitous disturbance of a well-compacted subsoil. Tapered piles would have had to be short with a small safe load per pile, so that the spread of footing required would be the same as that on the soil without piles. Deep pile foundations might serve to anchor the building against slipping, but the heavily loaded rotunda footing is surrounded by a comparatively light structure, about 250x350 ft. in size, which would have to be moved sidewise to allow the rotunda to be displaced along the surface of the ground. The area of the building, together with the graded and drained grounds around it, will make it impossible for water to collect beneath it, except at a considerable depth. This fact, together with the irregularity of the strata and the original absence of ground water, makes the hill very secure against any danger of landslide or settlement.

A mat foundation (Fig. 1) was therefore designed to carry the rotunda. The total weight carried is 110,000,000 lb. distributed in four corner piers and a square surrounding wall, 114 ft. outside to outside. The mat is 127 ft. square with an octagonal hole in the center 38 ft. across. Bending moments and shears were figured on the critical sections through this mat, and the consequent thickness of concrete varies from 8½ ft. under the piers to 4½ ft. at the edges. The mat is flat on top and slightly rounded

underneath. The first-story walls are 8 ft. thick and act as webs between the piers to distribute the load into a complete circle. The walls are heavily reinforced. The bending moments in the mat are all negative, and the shear is low, so the reinforcement consists of bottom steel in several layers, a small amount of compressive steel in the top, and the vertical and inclined rods from the first-story walls, which run to the bottom of the mat.

In order to avoid difficulty with mud in the excavation, the bottom of the area was floored with 6 in. of concrete, and 8-in. walls were built around the inner and outer edges of the mat. On top of this 6-in. floor, 1½-in. T-bars were laid, and the bottom steel was started on these. Heavy rains at this stage partly filled the site, as can be seen in Fig. 2, demonstrating the advantage of the concrete floor. When the vertical steel for the first-story walls was in place, as shown in Fig. 4, the mat was poured in a continuous operation.

Dome and Supports—The piers and walls of the rotunda are of concrete, with ½ per cent of vertical steel, and extend up to the four main arches, which spring from the sixth floor at El. +188 and support the dome. These arches are semicircular, with 31-ft. span, and open down to the fourth floor, 27 ft. below the spring line. The sum of their thrusts is a diagonal thrust at each corner of the rotunda, which is resisted by the walls of the wings and porticos meeting at this point. However, it was not considered safe to depend on these walls, because they do not have any obvious

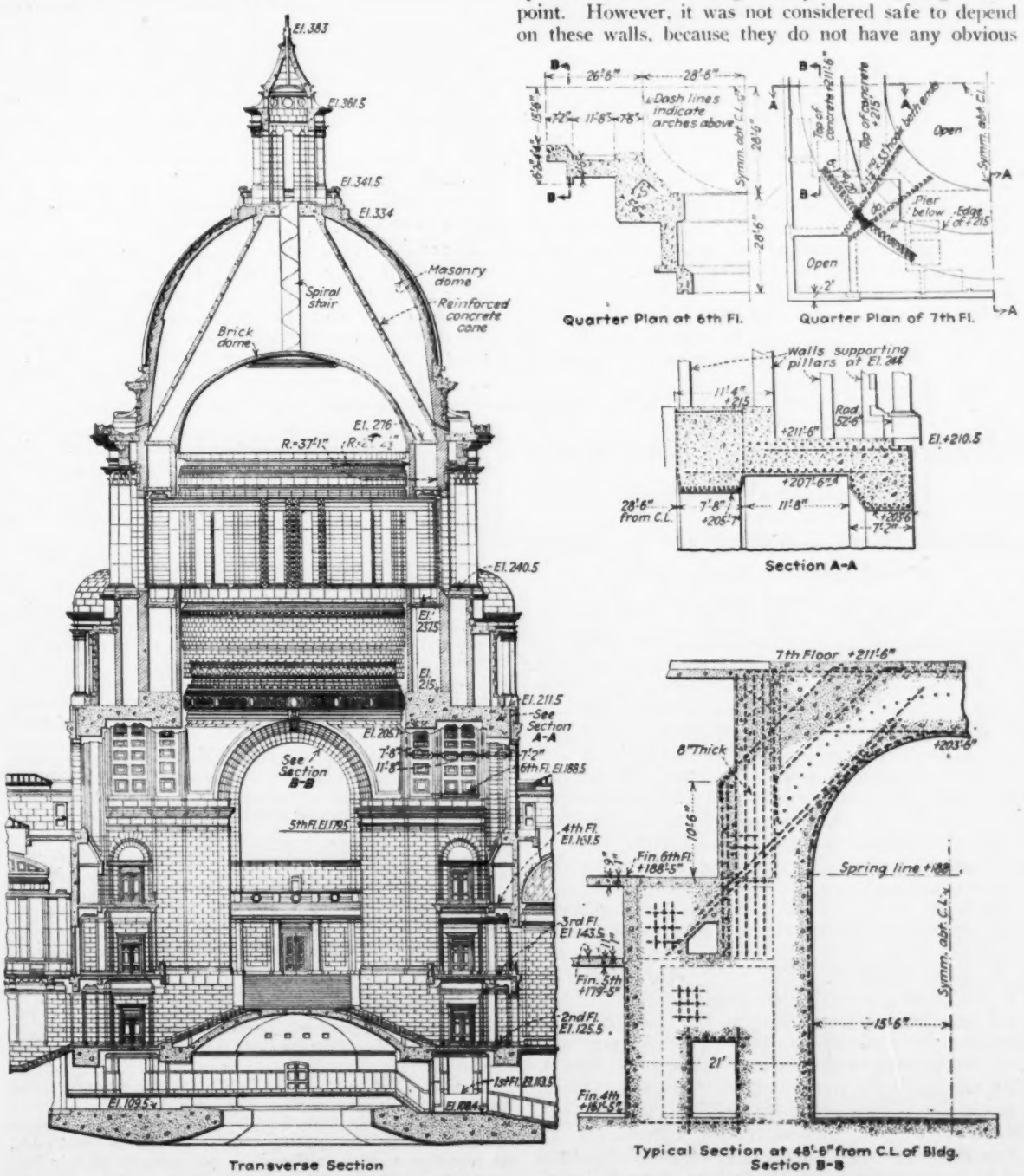


FIG. 3—DETAILS OF SUPPORTING STRUCTURE AND DOME OF WASHINGTON STATE CAPITOL

FIG. 4—POURING THE FOUNDATION MAT
Reinforcing steel in the walls extended to the bottom of the mat, and was therefore placed along with the steel of the mat proper.

connection with the arches, and in the future might be removed.

As a consequence the arches were figured as continuous frames down to the fourth floor, where a tension band is inserted capable of taking 800,000-lb. stress. The exterior walls are also pierced with arches at the same level, which are treated in the same way, although less heavily loaded. Heavy slabs are used at the fifth and sixth floors (Fig. 3) in the corners between the piers and outer walls to help distribute the thrusts evenly among the members. Above the arches is a system of spur walls and slabs to carry the circular walls of the drum. The arch drum acts as a deep beam (Sec. *AA*, Fig. 3), cast as a part of the arches and bent around them so as to transfer the loads to the four supports of each arch surface.

There are four domes in the rotunda, one a low-rise pyramoidal dome under the main stairs forming the ceiling of the restaurant on the ground floor. It is 18 in. thick, has no tension in the shell and is tied with a band around the spring line figured for 300,000-lb. tension. Over the rotunda is a ceiling dome of conoidal profile, with a span of about 59 ft. and a 24-ft. rise. It is built of brick with steel tension bands in the haunches. Above the ceiling dome is a steel and concrete cone supporting the lantern, and over this is the outer dome of stone backed with brick. This outer dome is 74 ft. internal diameter and almost spherical. Its plane of rupture is about one-third down from the top, and the total tension is 220,000 lb., distributed from the plane of rupture to the spring line. This tension is taken by $\frac{3}{8}$-in. bronze rings, which, at a working stress of 16,000 lb., will stretch about 1/80 in. to the foot; the masonry of the lower part of the dome was not pointed until this stretch had taken place.

The architects for the Washington State Capitol group are Wilder & White of New York, with Bebb & Gould, Seattle, associated architects. The design of the structural work was made by the Gunvald Aus Company, New York City. The contractor is the Sound Construction Company, Seattle.

Provisions of Welding Society Code for Structural Welding

Committee's Work Completed and Its Recommended Practices Approved by the Parent Body

THE committee on building codes of the American Welding Society has recently completed its work in formulating a code "for fusion welding and gas cutting of structural steel," and its recommended practices have been approved by the society. According to President F. T. Llewellyn, a definite attempt was made to keep the code as simple as possible in the first edition and to follow unusually conservative practices. Brevity is assisted by referring whenever possible to the American Bureau of Welding Specifications, published in 1928 by the structural steel welding committee, instead of giving the data in this code.

The members of the committee on building codes, which is still at work compiling two other codes, one for piping and one for tankage in buildings, are as follows: E. A. Doyle, chairman, Linde Air Products Company; J. L. Anderson, Air Reduction Sales Company; Gilbert D. Fish, Westinghouse Electric & Manufacturing Company; F. T. Llewellyn, U. S. Steel Corporation; F. P. McKibben, General Electric Company; H. H. Moss, Linde Air Products Company; James W. Owens, Newport News Shipbuilding & Dry Dock Company; and Edmund Vom Steeg, General Electric Company.

This code for fabrication and erection of structural steel by fusion welding and gas cutting known as Part A has been so arranged that it may be embodied wholly or in part in existing municipal or other building codes. The practices upon which it is based have been proved safe by experience. It is reproduced in its original form below:

Section 1 — General Application

1. Fusion welding may be substituted for or used in combination with the riveting, bolting or other requirements already prescribed in the building code of the city of———, hereinafter called the "Building Code," for connecting together, or assembling the component parts of, steel beams, girders, lintels, trusses, columns and other structural steel used in building construction; provided that the welding be done in accordance with sections 3 to 7, inclusive, of this code.

2. Gas cutting may be substituted for shearing or sawing in the fabrication of structural steel members or parts used in building construction, provided the cutting be done in accordance with section 8 of this code.

Section 2 — Definitions

The definitions of welding terms, as approved and published by the American Welding Society, shall govern for any welding terms appearing in this code. For convenience, some of the more common terms have been included herein, and their specific applications under this code are defined as follows:

1. *Fusion Welding*—The process of joining metal parts in the molten, or molten and vapor states, without the application of mechanical pressure or blows. Under this code, fusion welding is restricted to the arc and gas welding processes.

2. *Root*—The zone at the bottom of the cross-sectional space provided to contain a fusion weld.

3. *Throat*—The minimum thickness of a weld along a straight line passing through the root. Under this code, the throat of a fillet weld shall be the distance along a line from the root to the hypotenuse at right angles thereto of

the largest isosceles right triangle that can be constructed in the cross-section of the fillet weld; and the throat of a butt weld shall be equal to the thickness of the thinner part joined.

4. *Fillet Weld* — A weld of approximately triangular cross-section, whose throat lies in a plane disposed approximately 45 deg. with respect to the surfaces of the parts joined. The size of a fillet weld shall be expressed in terms of the width in inches of its adjacent fused sides.

5. *Butt Weld* — A weld whose throat lies in a plane disposed approximately 90 deg. with respect to the surfaces of at least one of the parts joined. The size of a butt weld shall be expressed in terms of its net or unreinforced throat dimension in inches.

6. *Weld Length* — The length of a weld shall be considered to be the unbroken length of the full cross-section of the weld exclusive of the length of any craters.

7. *Weld Dimensions* — Under this code the dimensions of a weld shall be expressed in terms of its size and length.

8. *Gas Cutting* — The process of severing ferrous metals by means of the chemical behavior of oxygen, in the presence of ferrous metals at high temperatures, to produce a kerf or cut of uniform width without burning the edges of the kerf or cut.

Section 3 — Materials

1. The grade of structural steel to be used under this code shall be that already prescribed in the Building Code.

2. The electrodes, welding wire and/or welding rods, shall either be one of the grades specified by the American Bureau of Welding in its Bulletin No. 2, or some equally good grade which, in the hands of an experienced welder, shows good weldability in flat, vertical and overhead positions. In the discretion of the superintendent of buildings it may be required to show the strength specified in paragraphs *c* and *g*, section B, of the American Bureau of Welding Specifications.

Section 4 — Permissible Unit Stresses

1. Welded joints shall be proportioned so that the loads specified in the Building Code shall not cause stresses therein to exceed the following amounts in pounds per square inch:

Shear on section through throat of weld	11,300
Tension on section through throat of weld	13,000
Compression on section through throat of weld	15,000

Maximum fiber stresses due to bending shall not exceed the values prescribed above for tension and compression respectively.

2. In designing welded joints adequate provision shall be made for bending stresses due to eccentricity, if any, in the disposition or section of base metal parts.

Section 5 — Design

1. The architect or engineer designing or supervising a welded structure shall be experienced and skilled in such work.

2. *Plate Girders* — Girders shall be proportioned either by their moments of inertia or by the flange-area method. In applying the flange-area method to welded girders having no holes in the web, one-sixth of the web area may be considered a part of each flange area.

Stiffeners may be either angles or flat bars welded to the top and bottom flanges and to the web by continuous or intermittent fillet welds designed to transmit the stresses.

Connection of component parts of flanges to each other and of flanges to web shall be by continuous or intermittent fillet welds designed to transmit the stresses.

3. *Beams* — The use of continuous beams and girders, designed in accordance with accepted engineering principles, shall be permitted provided their welded connections be designed to transmit the stresses to which they may be subjected. The connections at the ends of non-continuous beams shall be designed so as to avoid excessive secondary stresses due to bending.

4. *Columns* — Fillet welds connecting the component parts of a built-up column may be either continuous or intermittent. If intermittent, the length of each weld at the ends of the column shall be equal to the least width of the column. The length of the intervening welds shall be not less than 1½ in., spaced not more than 4 in. in the clear. The size, length and spacing of the fillet welds shall be such as to provide the same strength, per unit of column length, as the rivets specified elsewhere in the Building Code.

Lattice bars and tie plates, if used, shall be welded so as to secure strengths equal to those of the rivets specified therefor elsewhere in the Building Code.

5. *Butt Joints* — The edges of base metal parts, ¼ in. or more in thickness, transmitting stress by means of butt welds shall be beveled. For single- and double-vee joints, the bevel of each part shall be not less than 30 deg., thus forming an open space with an angle of not less than 60 deg. For single- and double-bevel joints, the bevel shall be not less than 45 deg.

Before welding, the root edge or face of one part shall be separated from the root edge or face of the other part by the spacing given for butt joints on pages 22 to 28 inclusive, of section E of the American Bureau of Welding Specifications.

All butt welds shall be reinforced by depositing additional metal on the weld to a height extending beyond the surface of the thinnest part joined. The height of said reinforcement shall not be less than the following percentages of the thickness of the thinnest part joined: 20 per cent for single-vee and single-bevel butt welds, and 12½ per cent, on each side, for double-vee and double-bevel butt welds.

Section 6 — Workmanship

1. Contractors for welded structures shall be required to satisfy the superintendent of buildings as to their ability to produce satisfactory welded joints of the forms specified, and with the process (arc or gas), materials and equipment to be used on the proposed work.

2. The quality of welds permitted under this code shall conform to the practice recommended in section D of the American Bureau of Welding Specifications.

3. Surfaces to be welded shall be free from loose mill scale, rust, paint or other foreign matter. A thin coat of linseed oil or equivalent, over the surfaces to be welded, need not be removed. This provision applies both in the case of new structures and where new steel is to be welded to steel in an existing structure.

4. In assembling and during welding, the component parts of a built-up member shall be held by sufficient clamps, or other adequate means, to hold the parts in proper relation for welding.

Section 7 — Erection

1. Structural steel parts shall not be painted before they are welded. Parts that are welded in the shop, to be erected by bolts or rivets, shall receive the usual painting after the shop welding is finished. Parts to be field welded shall receive a coat of linseed oil after shop work is completed, and after erection and field welding they shall receive as many coats of paint as the total number specified elsewhere in the Building Code for shop and field painting.

2. For all welded structures over 30 ft. in height, erection bolts or equivalent means shall be employed for temporarily supporting the members and for insuring proper alignment.

Section 8 — Gas Cutting

1. The contractor shall be required to satisfy the superintendent of buildings as to his ability to produce satisfactory gas cuts.

2. Gas cut edges shall be smooth and regular in contour.

3. Gas cutting may be used in the preparation of base metal parts for welding, provided the edges so cut are thoroughly cleaned after cutting so as to expose clean steel.

4. Gas cutting shall not be permitted to replace the milling of surfaces specified elsewhere in the Building Code.

5. Gas cutting shall not be permitted on any member while it is carrying stress. This restriction shall not apply to detail cutting for the correction of minor fabricating errors where the removal of metal resulting from such gas cutting would not reduce the required strength of the member that is to be cut.

6. Gas cutting of holes in a member which has not been designed therefor shall not be permitted.

Recent City and Regional Planning in New York State

Several Dozen Communities Have Adopted Improvements and Made Regulations for Future Development

By George B. Ford
Of the Technical Advisory Corporation, New York City

AT LAST New York State communities are actually beginning to control their own destinies. Thanks to the city, town and village planning law of 1926, which was the greatest step forward in planning that the United States has ever seen, any municipality in the state—large or small, urban or rural—can definitely control all plats and subdivisions and can make them conform to the lines that the municipality lays down. Already several dozen communities have adopted "as is" official maps—that is, they have adopted officially a map of the city or village showing the streets as they are today, and along with that they have adopted platting regulations and standards so that now they can even refuse public services and building permits if the private developer fails to conform to the official map and regulations.

More important still, seven municipalities—Mamaroneck, Rye, Schenectady, Bronxville, White Plains, Mount Kisco and Briarcliff Manor—have adopted *amended* official maps, on which they have shown a comprehensive system of proposed new highways and highway widenings together with proposed parks and parkways that the municipality would like to see realized in the future. Today in these seven communities every new subdivision is conforming to these future highway lines. In other words, these municipalities are now growing the way the municipality wants them to grow and not according to the whim of the individual subdividers. It is a long step forward.

Dejogging Highways—Poughkeepsie shows a particularly interesting solution of a most pressing highway problem. The Albany Post Road took a dangerous and most inconvenient double jog in the very center of the city. A small group of public-spirited citizens bought up all the back land through the centers of several deep blocks and projected the Post Road directly through, eliminating both jogs, and they retained all of the land on both sides of the new street. They have planned all their abutting property according to a unified architectural scheme of development, and already five or six of the principal buildings have been erected so that now one can actually begin to see an entirely new business center all in one harmonious scheme of architecture, creating out of whole cloth, as it were, the new shopping center of the city.

The village of Irvington has also through its planning board projected a new business center at the junction of the Albany Post Road and Main St., creating a large plaza with ample facilities for parking and circulation out of the continuous through travel of the Post Road. This whole development is projected in a harmonious architectural treatment which should create a particularly interesting feature.

Abstract of a paper read June 20, 1929, before the New York State Conference of Mayors at Binghamton, N. Y.

Improving Railway Station Surroundings—The town of Bedford is considering the same sort of thing at Bedford Hills around the station, again eliminating a bad jog in the main highway by carrying it straight through and creating an interesting architectural group of the new business center.

Mamaroneck is presenting a striking example of how to solve the railway station problem. A five-acre swampy field with old shacks has just been bought by the village at the united request of the various civic bodies. Plans and perspectives have been prepared for turning it into a charming park with parking space for nearly 300 automobiles with ample approach thoroughfares from all directions. More important still, almost all the property owners around the park have agreed to abide by a common harmonious scheme of development which was worked out as part of the project. The complete layout of the surroundings has been adopted officially as part of the official map of the village. The village of Rye, at the request of its planning board, has recently purchased a tract of land adjoining the station, including a new approach street, with the expectation of providing parking space for nearly 300 automobiles. New Rochelle, at the request of its planning board, is negotiating with the railroad for the creation of a large station plaza with new approach streets which should most effectively solve the present cramped station surroundings. Elmira holds the record for the state for the speed with which it has carried through to completion its grade-crossing elimination problem with all three railroads so that within less than two years after study of the project had been begun the actual elimination was under way in all parts of the city.

Scarsdale is pointing the way in keeping its White Plains Post Road intact without having to destroy about a hundred of its fine trees. It is doing it by an ingenious scheme of permitting parking on earth shoulders in alcoves between the trees, which from a traffic standpoint is just as satisfactory as though the trees had been removed entirely.

Parks and Civic Centers—What is true of highways and paving is likewise true of parks, playgrounds, schools, school grounds, fire stations and other public tracts and buildings. New Rochelle in particular is pointing the way for study of all these problems quantitatively on a fact basis, calculating just how large an area is necessary for each playground, neighborhood park or school yard; just where it ought to be located and when it ought to be acquired. In this way a definite program of improvements for a period of years can be made so that each item will be taken up as soon as needed but not sooner.

Mount Kisco is carrying out its new civic center plan by purchase of a number of acres in the middle of the village from the New York City Board of Water Supply, and on these it is locating not only the new village hall but five other public and semi-public buildings to form a most impressive group with a very picturesque brook running through it. At the same time parking space is provided for several hundred automobiles which can be used in connection with both the railroad station and the civic center. Furthermore the scheme provides for an attractive parkway and park in the center of the village. All of this is part of the amended official map of the village.

Waterfront Improvements—Mamaroneck already owns most of the land necessary to develop its whole

harbor for recreation, pleasure boating and also for commercial docks. The scheme is so arranged that the commercial port is hardly visible from the pleasure harbor and from the parks, as it is down at a lower level so that the two can carry on side by side without interfering with each other. The whole layout will be plainly visible for a stretch of about a mile along the Boston Post Road, so that it is bound to impress the village on the memory of the passing motorist.

New Rochelle has been endowed by nature with a remarkably varied and interesting waterfront, but the present harbor and port development is one of the most unpleasant sights imaginable, distinctly unworthy of the city. To meet this situation the planning board has evolved a scheme which provides for parks and a new and interesting residential development around the harbor; for a big commercial port and for a new highway to relieve the Post Road, to say nothing of bathing beaches and boat clubs, all combined in one comprehensive project which will convert the port of New Rochelle from an eyesore into an outstanding beauty spot of the city. Fortunately the key land of this development already belongs to the city.

Airfields—Airfields are springing up all over Westchester County. Sites for airfields have been carefully chosen in connection with the city plans for White Plains, Rye, Bedford, Briarcliff Manor and Ossining. At the same time through zoning and other means every endeavor is being made to control or mitigate the unpleasant features of the airport in so far as they affect residential surroundings.

Regional Planning—Regional planning is coming rapidly to the fore, the most striking example being the New York regional plan, recently published. In New York State these plans include the whole of Westchester and Putnam counties and part of Dutchess, to say nothing of Orange and Rockland counties. The individual municipalities are finding these plans of the utmost value in helping them determine the main lines of circulation and parks within their borders.

Long-Term Programs—In Westchester County alone at least fifteen communities are making comprehensive city, town or village plans, and there is a general feeling among the municipalities there that they can afford to wait no longer. For these plans they are making out an order of urgency in which the proposed public improvements shall be taken up. More than that, they are making an approximate estimate of the cost of each project and of how much money the community can have to spend on improvements in any one year, and they are so distributing their proposed improvements in their trial budgets that the whole program of the comprehensive plan can be realized over a period of years without raising taxes. In fact, in some instances they even expect to lower them. Trial budgets of this sort have already been adopted in Rye, Briarcliff Manor, Bronxville, White Plains and Mount Kisco, and similar ones are now being prepared in New Rochelle, Mamaroneck, Bedford, Ossining and Irvington.

Today there is a great deal of experience available to prove that city planning is no longer a theory but a practical working proposition—merely a far-sighted application of good business practice to the development of the municipality.

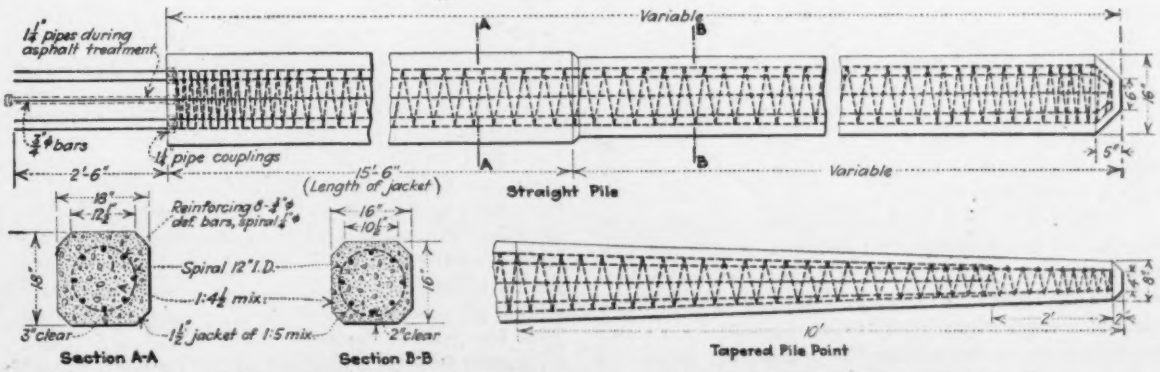
Improved Asphalt Treatment for Concrete Piles in Sea Water

Port of Los Angeles Continues Impregnation Practice With New Pile Design Developed by Further Experimentation

By G. F. Nicholson
Harbor Engineer, Port of Los Angeles

IMPROVED methods of impregnating reinforced-concrete piles with asphalt to prevent the infiltration of sea water and attendant deterioration have been developed recently by the Los Angeles Harbor Department. Continued experimental work during the past three years on this phase of port construction has indicated the desirability of slightly revising the original treated piling specifications of the Harbor Department as regards both the process of manufacture and the application of asphalt. Methods previously used were briefly described in *Engineering News-Record*, Dec. 16, 1926, p. 990.

The outstanding feature of the improved bearing pile design is the addition of a jacket of concrete 1½-in. thick, poured monolithically around the upper portion of the core or pile proper from the top to a point approximately 3 ft. below low water level. The purpose of this jacket is to afford added protection for that part of the pile which is subject to the greatest effect of salt water deterioration. The concrete of the jacket is a slightly drier and leaner mix than that used for the core and the outer 2-in. concrete protection for the reinforcing steel of the pile proper. The jacket composition is one part cement to five parts of graded aggregate, the largest size of which will pass a ¾-in. screen. Water content is limited to a maximum of 5 gal. per sack of cement, and



JACKETED REINFORCED-CONCRETE PILE TO BE IMPREGNATED WITH ASPHALT

the slump may not exceed ½ in. Experiments indicate that the asphalt will entirely penetrate the leaner mixture of the jacketed portion and in addition will penetrate the pile proper to a depth of from ⅛ to ½ in.

The core of the pile and the protection over the reinforcing steel—that is, all concrete under the jacket—is composed of the usual grade of concrete proportioned to secure maximum density, and consists of one part cement to 4½ parts of graded aggregate. Water content for this class of concrete is limited to a maximum of 6¾ gal. per sack of cement, while a maximum slump of 2 in. is permitted. The jacket concrete is poured simultaneously with the core of the pile, resulting in a monolithic construction. Separation of the two classes of concrete throughout the length of the jacketed portion during the pouring operation is accomplished by means of light movable steel plates which are withdrawn progressively in stages as the concrete rises on both sides of the plates. A very dense concrete has been obtained in the construction of these piles by the use of pneumatic hammers on the sides of the forms during pouring. Compressive tests of this dense concrete show it to be considerably stronger than the concrete poured without using the air-hammers.

Piles which are designed for driving in sandy areas or locations permitting doing this without much difficulty have a uniform cross-section throughout the entire length below the jacketed portion, terminating in a blunt point.

The use of chisel-pointed piling has been discontinued as undesirable, since such piles tend to rotate during jetting and driving, making it impracticable to maintain the desired alignment. Under conditions which require driving into or through layers of hard material offering considerable resistance to penetration, even when jets are employed, the design is altered by gradually tapering the lower portion of the pile on four sides.

The difficulty formerly encountered in removing the asphalt which adhered to the projecting reinforcing bars during the treating process has been completely obviated in the newer design. This is done by embedding pipe couplings in the head of the pile and centering them around the bars. Just prior to placing the piling in the asphalt-treating chambers, pipes are slipped over the rods, screwed into the couplings and capped. In this way asphalt is prevented from coming into contact with the reinforcement.

Under the process formerly used for the impregnation of piling, which was described in the article already referred to, observations made with the aid of resistance thermometers indicated that accelerated heating and cooling caused undesirable, but not serious, internal stresses. Piles are now heated and cooled gradually by increments limited to 5 deg. F. per hour with added precautions to guard against chilling. The fully cured piles are pre-dried in a chamber during a period of twenty hours, the temperature being raised slowly to a maximum of 200 deg. F. Free water is driven off during this process to the approximate depth of the succeeding asphalt penetration.

The piles are then transferred from the preheating chamber to the impregnation cylinder and there subjected to a 26- to 28-in. vacuum for one hour at a temperature of 180 to 220 deg. F. Asphalt is then introduced at a temperature of 250 deg. F., with the vacuum maintained until the cylinder is completely filled. A pressure of 250 to 300 lb. per sq.in. is then applied and maintained for three hours. During the first hour the temperature of the treating cylinder is kept at approximately 250 deg. F. During the second and third hours the temperature is allowed to cool to 240 deg. F. After the three-hour high-pressure period, the temperature is allowed to cool gradually to 200 deg. F. during a period of eight hours, with pressure reduced to not less than 40 lb. per sq.in., after which the asphalt is withdrawn and the piling is permitted to cool gradually to normal temperature. The rate of change for both cooling and heating is maintained below the limit of 5 deg. F. per hour.

Conclusions—The engineering department of the port of Los Angeles after fourteen years of research and experimentation is of the opinion that the production of reinforced-concrete piling absolutely impervious to sea water is unattainable in practice, the process of manufacture, handling, driving and curing tending to produce minute cracks offering entrance channels for water. Moreover, observations made over a long period of time indicate that concrete made under the best laboratory conditions still possesses the power to absorb a small percentage of water.

The method of asphalt treatment now used is believed to waterproof the pile thoroughly and at the same time provide a seal for the minute cracks which are produced in manufacture and driving.

For some time considerable experimental work has been undertaken to find a suitable waterproofing compound that might be used with success in the jacket, thereby eliminating the hot asphalt pressure treatment. However, after thoroughly testing fifteen of the most widely used waterproofing compounds, no satisfactory waterproofing agent was found.

Further research work in this field is highly desirable, with the production of concrete piling for use in sea water which will be absolutely waterproof and therefore non-absorptive as the ultimate objective.

City Boards Co-operate for Playgrounds and Schools at Dallas, Tex.

Securing adequate playground facilities for the present schools and purchasing at reasonable prices land for new schools are problems of the Board of Education, Dallas, Tex. The board has adopted the policy of purchasing new lands in advance of development and accordingly has secured a number of tracts of 6 to 10 acres, at prices ranging from $750 to $1,250 per acre. The prices for individual lots necessary to increase the size of grounds for existing schools have run as high as $500 per front foot. Through a plan of co-operation the Board of Education and the Park Board have been able to secure school grounds and play parks advantageously located and of adequate size at comparatively reasonable cost. The Board of Education in a number of instances has purchased more land than is absolutely necessary for the schools, whereupon the Park Board has installed play apparatus and wading pools on these grounds and maintains the grounds during the vacation periods, the Board of Education turning over to the Park Board certain school facilities during these periods. In other instances the Park Board has set aside part of the park lands for school purposes under a form of "lease" agreement. This has enabled both the Park Board and Board of Education to keep well ahead of the demands for school and playgrounds.

Reconstructing a Drainage-Ditch System

Fleet of 35 Dragline Excavators Enlarges Old Ditches Dug by Floating Dredges—Comparison of Methods—Dressing Flat Slopes—Farm Inlets—Flood Damages

By H. W. English and Albert S. Fry
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IN THE improvement of a land drainage district of 430 square miles in Mississippi County, Ark., 416 miles of ditches was dug or enlarged, involving about 18,077,000 cu.yd. of earth excavation, nearly all of which was handled by dragline machines. This project was described in *Engineering News-Record* of June 27, 1929, page 1026, and the present article deals with the construction plant and methods.

Construction Equipment—The improvements to the old drainage system were designed to be constructed with dragline excavators. When the first construction was undertaken, the floating dipper dredge was the cheapest means for constructing drainage ditches. But the advance in dragline design and economy of operation was such that for the new work draglines were practically the only machines considered, the specifications stating "no floating equipment will be permitted." Of 35 excavators used all were draglines except one walking land-dredge which straddled the ditch. Not all of these were on the project at the same time, but during the peak of the job 28 draglines and the land-dredge were working. The largest machine, with 3½-yd. bucket and 100-ft. boom, is shown in Fig. 1, while Fig. 2 shows a walking dragline engaged in widening and deepening an outlet channel.

FIG. 1—DRAGLINE ENLARGING TYRONZA RIVER
This machine, mounted on trucks, has a 100-ft. boom and 3½-yd. bucket.

In size, the dragline machines ranged from buckets of 1- to 4¼-yd. capacity on booms 38 to 100 ft. long. The larger machines were used on the outlets and the smaller draglines were used on the reconstruction of the laterals. The walking land-dredge (Fig. 3), which straddled the ditch and had a 50-ft. boom and 1-yd. bucket, excavated some of the new laterals, but was not suitable for redigging laterals or for large outlet ditch excavation. The best records were made by two 3½-cu.yd. walking draglines; one averaged 78,000 cu.yd. per month for 22½ months and the other 70,000 cu.yd. for 27 months with no allowance for delays. The largest monthly excavation was 127,400 cu.yd. for one machine and 123,000 cu.yd. for the other.

All the machines were operated on a 24-hour schedule, necessitating at least two operators for each machine. It was necessary to educate all these operators to dig the new work in the required manner. Most of them had had no previous experience in digging canal slopes flatter than 1 on 1, and in most cases their previous work had been carried on with very little effort to more than approximate specified slopes. It must not be presumed that the contractors were compelled to put a "sandpaper" finish on the work, but careful supervision was given to insure true side slopes as specified. Typical finished slopes are shown in Fig. 4.

Slope Templets—As the construction engineers could not remain on any one piece of work continuously, it was necessary to devise some mechanical means, which could be used by the average laborer, to check up the work as the excavating progressed. This resulted in the "slope level" shown in place on the bank of a ditch in Fig. 5. It consists of a straight, well-seasoned 2x4-in. piece of pine, 16 ft. long, with an ordinary 30-in. carpenter's level having one end hinged to it by a ⅜-in. bolt about 7 ft. from the end of the stick. The other end of the level was connected to the 2x4-in. stick by a vertical rod which was made adjustable by threading a length sufficient to pass entirely through the level; then the stick was held at the correct inclination by two nuts which could be adjusted to vary the length of the rod. One contractor made a float with uprights and arms cut to

FIG. 2—DRAGLINE ENLARGING OUTLET CHANNEL
A 3½-yd. bucket is handled by a 70-ft. boom.

FIG. 3—STRADDLING DREDGE ON LATERAL DITCH

the proper length to define a 1 on 2 slope. This float could be pulled along in the channel as the work progressed, but it was not a success, as it would get in the way of the machine operations.

Construction Methods and Difficulties—Enlargement was made usually on one side only of each ditch. Further deterioration on the undisturbed side is unlikely. On this latter side, also, for a width of 10 ft. the bank was cleared of all trees, objectionable growth and debris, so as to leave the entire cross-section in good condition. An exception to the one-side enlargement was made where slides had occurred on the opposite side, the slide material being removed and the ditch shaped to a uniform cross-section.

Because of the large original spoilbanks along outlet ditch 6, it was more economical to enlarge this also on one side, moving as much of one spoilbank as necessary but not disturbing the opposite bank. The Tyronza River outlet, ditch 31, was enlarged also on one side for the upper part of its length, but for several miles back from the river the old spoilbanks were relatively small and the channel was enlarged on both sides, moving both existing spoilbanks.

Berms on the outlet ditches were 25 ft. wide, sufficient for a dragline machine to travel in doing future maintenance work. In some of the enlargement work and all of the lateral reconstruction, it was necessary to excavate part of the existing spoilbanks to form the berm, the elevation of which was 12 ft. above grade line. On the original work tree trunks, brush and other materials resulting from clearing the right-of-way were piled under the spoilbanks, while stumps were deposited in these banks by the dipper dredges. In the enlargement work which required moving old spoilbanks, this debris was more or less troublesome to excavate and retarded operation. On one contract the elevation of cutoff of the old spoilbank was raised 3 ft. above the standard 12 ft. in order to avoid most of the debris.

Excavation Methods—Double cutting was resorted to on some of the outlet work. One contractor excavated to within about a foot of the finished slope on the first cut and then traveled back at a later time to remove the bottom of excavation and finish the slope. With this procedure the draglines had to pass over the work four times on new outlet ditches and where ditches were widened on both sides.

Work on ditch 6 was done mainly by three dragline machines, with four for a part of the time. The first operation was with a dragline with 45-ft. boom cutting down the existing spoilbank to make a track for a dragline with a 70-ft. boom. This latter machine then dug about 25 per cent of the new cross-section to grade, leaving a track for the two trailing draglines, each with 75-ft. booms, which completed the channel. After a few months the contractor decided that the machine with 45-ft. boom was not doing profitable work, and thereafter the machine with the 70-ft. boom prepared its own path.

The machines on ditch 6 and ditch 31 were a long way from a base, and getting fuel, supplies and repairs to them was difficult. Small repair and blacksmith shops were built near the center of the work to handle light repair jobs, these shops being moved as the work progressed. During the winter and spring light-draft motor boats were used to deliver fuel and supplies to the shops. All the excavating machines had internal-combustion engines and fuel oil was delivered in barrels to an accessible point on the existing canals and floated direct to the machines.

The walking draglines experienced some difficulty in moving about in wet weather, especially when traveling over areas which had been cleared of timber and from which the stumps had been removed by blasting, as the stump holes would fill with water and keep the sur-

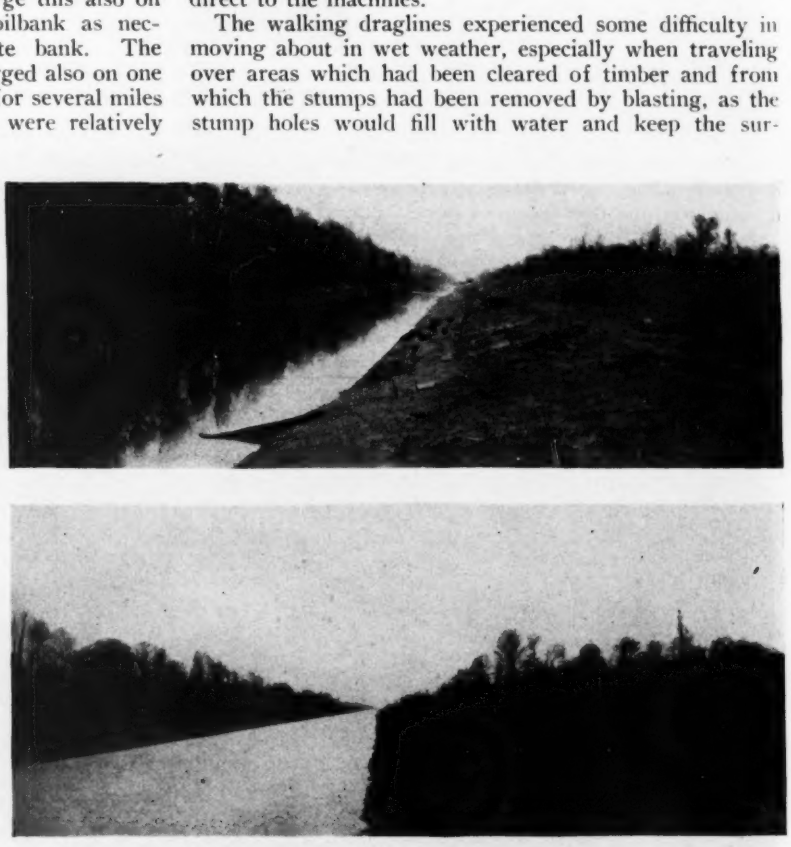


FIG. 4—CHARACTER OF DITCH BANKS

Above—main ditch 6 enlarged and with new 1 on 3 slope. Below—main ditch 31, slope at right will weather to smooth surface. Note straightness of water lines and top of slopes.

FIG. 5—TEMPLET FOR SLOPE OF BANK

rounding ground saturated and soft. Mats were made up of poles, 30 to 35 ft. long and about 8 in. at the butts, with a hole 3 ft. from the end, six or eight poles being strung together loosely on a loop of ¾-in. or 1-in. steel cable which furnished a handle. To the bucket-pulling line was attached a short chain or cable with a hook. This served for moving the mats, by hooking into the cable loop and swinging the machine. Five or six of these mats were necessary for one machine. Properly laid on the ground, they made a satisfactory footing for the machine, and they were moved ahead one at a time as the work advanced.

FIG. 6—DRAGLINE ENLARGING LATERAL DITCH

On some of the enlargement work, especially where the original canals were dug through cypress swamps or bayous, the silting of the old ditches had been considerable and it was difficult to hold a new ditch section to the slope specified. Where the silt was particularly wet, it was found necessary to dig a much larger cross-section, somewhat above the specified grade line and with side slopes of 1 on 3 to insure the required capacity. In redigging the lateral canals, the drag line leveled down the old spoilbank on one side to 12 ft. above the grade line of the ditch and then traveled along this path to perform the excavation. The material excavated was cast over the remaining portion of the old spoilbank so that the same path would be available for future maintenance. A dragline machine with crawler traction is shown in Fig. 6 redigging a lateral ditch. The enlarged size and the flat slope on the newly excavated side are noticeable.

Inlet Ditches—Where farm drains or natural depressions were intercepted, inlet channels were excavated back about 50 or 75 ft. from the main ditch, usually terminating at the right-of-way line. Such an inlet is shown in Fig. 7. They were dug to the grade of the main ditch and an 8 ft. berm was left on each side. The average excavation in inlet ditches for the laterals was slightly less than 500 cu.yd. The landowner constructs farm drains as extensions of the inlets, but usually at less depth, so that his drains cut back. The inlets serve as sumps or settling basins where material eroded from the farm drains is deposited instead of being carried into the main ditch to form bars.

On all laterals dug by the straddling dredge it was necessary to go over the work with a dragline to excavate the inlet ditches. This made the economy of the dredge doubtful. Where the dragline excavator worked on one side of a ditch, it could not dig new inlets on the opposite side. Bars caused by old inlets were removed and it is not likely that there will be future deposits, as most of these ditches have had several years to erode and should now be much more stable. Up to this time the inlet ditches have been successful in preventing the forming of bars or deltas in the main ditches. The cost of these inlets is materially less than for other types of inlets and better results are expected.

Flood Damage in 1927—In the early part of 1927 rains were general over this region and all streams were in flood. Construction work was carried on under difficulties, and most of the excavating equipment lost about two months' time. The Mississippi River breached the levee at Dorena, about 100 miles above this project, and the escaping waters worked southward into the Little River basins. The St. Francis River overtopped and broke the levees along its east bank in several places in Dunklin County, Mo. Its flood water, flowing easterly

FIG. 7—BASIN FOR FARM INLET
This basin prevents erosion and clogging of main ditch by farm drains. Main ditch and spoilbank in rear.

into the Little River basin, reached Mississippi County, Ark., before the Mississippi River water and caused a stage a few inches higher than the water from the Dorena break, which arrived after the St. Francis flood wave had begun to recede.

The levees in Mississippi County along the east side of Big Lake and the Little River were broken and the floodwater spread east and south against the solid spoilbank of the original improvements. This bank had served its purpose successfully against a head of 2 or 3 ft. as planned, but when the Mississippi and St. Francis river waters raised the head to 7 ft., and even 10 ft. in places, trouble was to be expected. A determined effort was made to hold the embankment, and 250 men worked for several days and nights in building up low places with sacks and building sack rings around seeps and boils. Two breaks occurred, but no effort was spared in attempts to stop the flow through them. A piledriving outfit was floated into the first break and drove round piles for a cutoff wall which was faced with wire netting. Sand bags were dumped into the water to be washed against the piling by the current, effecting a complete closure.

Another break developed a mile or more down the levee about the time the first one was being closed, and as attention was directed to this second break the first one again gave way. The "blue hole" which had been washed out immediately behind the wall of piling had so weakened the support that a section of the piling collapsed. By the liberal use of sacks filled with earth, a large crew of men working both day and night held the inflow to a minimum, but flow continued until the water outside had receded.

After the flood it was decided to repair and rebuild 12 miles of the old spoilbank so as to prevent a recurrence of the trouble. For this work a small dragline removed approximately 10 ft. of the river side of the embankment, cleaning this material of all foreign matter, logs, stumps and brush. It replaced the clean earth and brought the spoilbank up to a uniform grade line. In removing the material from the face of the embankment, a core trench was dug about 4 ft. wide and 2 ft. below the original ground surface, within the cleared area.

Inspection Facilities—During the original construction the engineers had to ride horses or mules and often walk long distances to inspect the work. For the resident engineer to get to the outlet work and return to headquarters was a trip of several days. The staking out of the work was done from camps located at various points. In contrast to this, when the new work was undertaken, roads had been built. Some of them were hard surfaced, although most of them were dirt roads, which, however, were passable most of the time. The engineers did all of the surveying by working out from towns in the district with automobiles. Any point could be reached by automobile plus a reasonable amount of walking.

Progress Bulletin—A quarterly bulletin was published during the work for the purpose of keeping the landowners in touch with the progress. Each issue contained a map showing the work done and that remaining to be done, together with a description of activities during the quarter.

Cost—The bond issue for the project totals $2,425,000. The average cost per acre for the reconstruction for all of the lands was $11.20. Funds for the work are provided by bond issues extending over twenty years and to be paid by assessments against the lands made on a benefit basis. Unit prices for the outlet enlargement work varied from 8.9 to 9.75c. per cubic yard. Redigging the laterals varied from 9 to 30c., payment being made on a sliding schedule varying from 13,000 cu.yd. (or more) per mile to 4,000 cu.yd. per mile. Where the actual amount was less than the latter quantity, payment was made for 4,000 cu.yd. in consideration of the cost of moving the excavating equipment over the work.

Personnel—This drainage reconstruction work was carried out under the direction of the Morgan Engineering Company, Memphis, Tenn., with L. L. Hidinger, president, in direct charge of the project, and A. S. Fry as assistant engineer. H. W. English was resident engineer on construction for the major part of the work, and J. T. Olsen is resident engineer on the work now under construction. The contractors included: Oscar O. Kochtitzky, England, Ark.; Briggs & Drew, Omaha, Neb.; Roy L. Igo, Indianola, Iowa; Clark Brothers Construction Company, Clinton, Iowa; Broderick Brothers, Kennett, Mo.; Frank Volmer & Son, Luxora, Ark.; J. H. Boyce Sons Company, Omaha, Neb.; Crumpecker & Adams, Morehouse, Mo.; W. J. Gleason & Company, Aiken, Minn., and Otto Kochtitzky, Cape Girardeau, Mo.

Road Oil-Heating Plant for Los Angeles County

Plant Layout and Retorting Procedure—Retort Construction—Explosion Hazards and Precautions—Operating Force and Costs

By W. W. Shelby

District Engineer, Maintenance Division, Los Angeles County Road Department, Los Angeles, Calif.

With a consumption of one to two million gallons of road oil each year, which is not uncommon in some counties and in maintenance districts of state road systems, heating the oil becomes a major problem in plant installation. The plant and operating procedure described in this article represent about the greatest advance in highway department oil heating. They are such, too, as are within the ability of a wide range of maintenance districts to provide and the account has been made a little circumstantial in order that the example may be helpful in determining plant layout and equipment. —Editor.

THE Compton district of the Los Angeles County road department comprises approximately 1,100 miles of roads, of which about 700 miles are secondary roads. This mileage is maintained by sixteen foremen. The district is served by a warehouse centrally located in the town of Compton, which is designed to handle all equipment repair work and also to operate an oil-heating plant of sufficient capacity to heat all the oil used in the district, which varies from 1,500,000 to 2,000,000 gal. yearly. This oil plant is entirely new and involves innovations which are the result of previous experience combined with ideas gathered from consulting with and visiting neighboring refineries.

Only three classes of oil, 90 per cent asphaltic road oil, 60 per cent asphaltic road oil, and fuel oil, are received. The fuel oil is used under the boilers and to cut back the heavier oils when one lighter than 60 is desired. All oil is delivered in railroad tank cars. From these cars it is pumped into the cold storage tanks, the capacities and locations of which are shown in the diagram of the plant, Fig. 1. Two unloading pumps are installed, one being a reserve pump.

Retorting Procedure—The 90 oil tank is connected to an auxiliary tank by a 10-in. pipe. This auxiliary is an inclosed cylinder of 2,500-gal. capacity. As the viscosity of this oil is such that it is not fluid at ordinary temperatures of the atmosphere, the auxiliary contains steam pipes, by which the oil can be heated until it is easily handled by a pump. It is then forced through the 3-in. line *A-B* to the retort and returned through the 3-in. line *C-D* to the auxiliary. This process is repeated until the oil has reached the temperature desired, when by closing the valve on the return line and opening the valve to the 90 loading tank, the oil is pumped and held in storage ready to be loaded into the pressure distributor trucks (Fig. 2).

The temperature of the 90 is known at all points of the circuit by means of pyrometer connections in the auxiliary, at the discharge of the retort and at the unloading tank, supplemented by a thermometer between retort and point of hot storage. When 90 oil is pumped to the unloading tanks at night and is to be held for spreading the following day, it is heated to about 475 deg. in order to reach the job at 450 deg.

While this oil is being circulated to obtain the desired temperature, the expansion is handled by the overflow pipe *G-H*, which permits any excess oil to return to the original cold tank. This line also furnishes an intake for air when the hot oil is being pumped from the auxiliary to the loading tanks. All 90 oil lines are insulated and small steam lines are inserted to prevent the formation of slugs. The lines leading from the auxiliary and cold storage tanks to the retort have a drop of 1 ft. in order to drain when not in use. A connection (not shown in the diagram) from the intake of the retort to the sump completes the drainage scheme of these lines.

The treatment of the 60 per cent asphaltic oil is a simplified form of the process described for the 90. It is not necessary to preheat the 60 to any great degree before pumping. By inserting into the cold storage tanks sixteen 2-in. steam coils covered by a steel housing, all pumping difficulties are eliminated. No return line from the retort is necessary, as one passage is sufficient to raise the oil to the desired temperature. This oil should reach the job around 200 deg. Two of the three loading tanks are used for 60 oil, as a large amount of this oil is used on dirt roads, some on gravel and sand roads, and it is also used to mix with fuel oil to secure a 45 per cent asphaltic oil when much penetration is desired. An overflow line (not shown in the diagram) leading from the loading tanks to the original cold storage tanks or to the sumps prevents breaking the lines or pumps in case too much oil is pumped to the hot storage tanks and also serves to admit air when the tanks are being emptied.

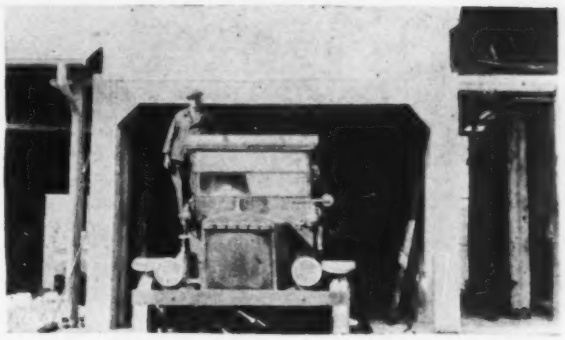


FIG. 2—PRESSURE DISTRIBUTOR TRUCK TAKING ON LOAD

Oil Supply to Distribution—The use of all hot oil must be anticipated by the road foreman, and an order book is kept showing the amount of oil requested, date of delivery, kind of oil, etc. It sometimes happens that rain or other causes prevent the use of oil on the dates booked. In this case it is necessary to empty the loading tanks to prevent the temperature from dropping below that required for good spreading. The tank insulation permits about 5 per cent loss of heat per 24 hours. Return pumps for both the 60 and the 90 oils are connected to the unloading tanks and also to the sumps. These pumps will return the hot oil to the original cold storage tanks. Steam coils in the sumps liquefy the oils for pumping.

The road crews are furnished with an insulated trailer of hot 90 oil each morning if working on macadam. This trailer has a capacity of about 300 gal. and is pulled by a regular maintenance truck. A pipe from the 90 loading tank gives a convenient means of loading, each trailer having its individual loading connection. In case some oil is returned in the trailers at night, it is emptied into the sump by a 12-in. line, into which a 2-in. steam line is inserted. The 12-in. discharge line is somewhat insulated by being covered with sand. The loading tanks are so elevated that the hot oil flows by gravity into the trailers for spreading.

Capacity and Construction of Retort—The retort

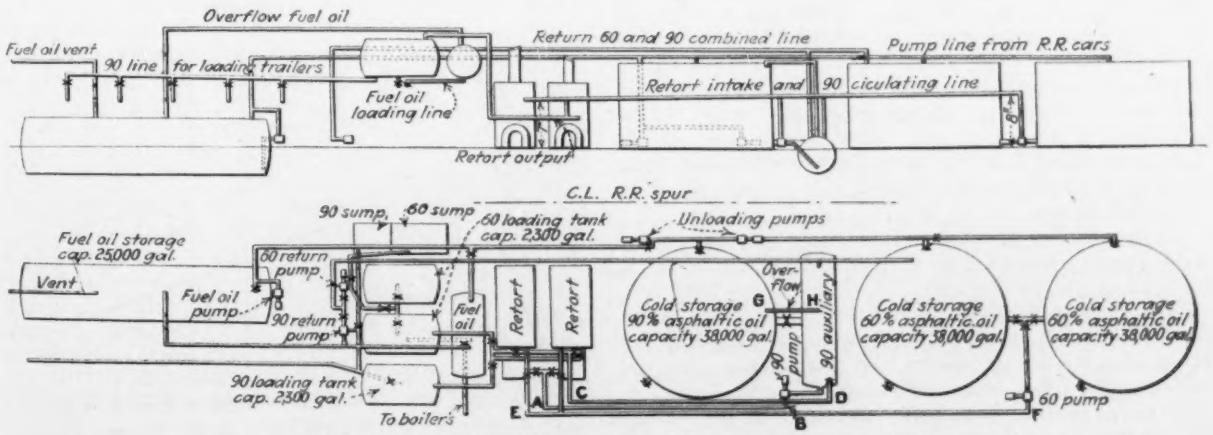


FIG. 1—OIL-HEATING PLANT LAYOUT, LOS ANGELES COUNTY, CALIFORNIA

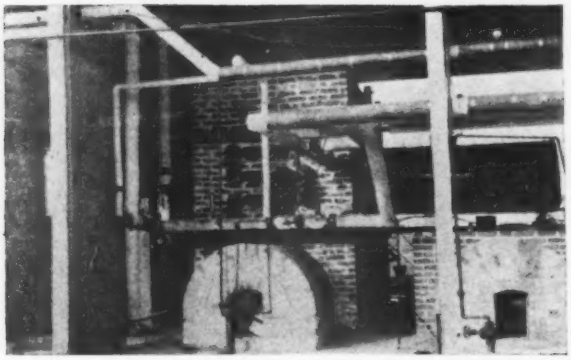


FIG. 3—FRONT VIEW OF HEATING RETORTS

(Fig. 3) is fired with fuel oil atomized by steam. The circulating tubes are made of ¼-in. seamless steel tubing. The cold oil enters at the top, and after passing through 24 pipes is discharged at the bottom; thus gradual heating is secured, the hottest oil being directly over the flame. The path of the flame is directed by sheets of asbestos material 1 in. thick. A space of ¾ in. is left at the sides for lateral expansion. The circulating tubes are fixed in the front wall but are free to expand at the rear end. The two bottom supporting tubes are simply ordinary pipe and become very hot. To prevent bending, water is circulated through them, but a more efficient scheme would be to pass the cold oil through before it enters the circulating tubes.

The capacity of a retort varies directly as the heating area of its circulating tubes, directly as the British thermal units generated per unit of time in the firebox and indirectly as the viscosity of the oil being heated. This particular retort has a capacity of about 1,000 gal. of 90 oil per hour. The capacity on heavy oils is a question of preheating them enough to permit pumping. By inserting steam coils in the cold storage 90 tank, the capacity could be raised to that of the capacity of the pump. The amount of 60 oil that the plant can handle is limited only by the capacity of the pump, as this oil is very easily preheated. The second retort is simply for cases of emergency. It would be possible and practicable to connect the retorts so that the 90 oil could be passed through the two in series, thus preventing its circulation in the auxiliary and thereby increasing the capacity of the plant.

Explosive Gases From Retort—Obviously a hotter fire is needed in the retort to heat 90 oil to 450 deg. than to heat 60 oil to 200 deg. When the heavier oils have been run continuously for several hours, the brickwork becomes very hot, and when the retort is closed down and drained, this heat is reflected, producing a very high temperature in the practically empty tubes, which we believe thoroughly gasifies any skim of oil. Temperatures of 600 deg. have been noted. Such heat, together with the proper mixture of gas and air, is a source of danger.

To lower this temperature in the retort tubes, the work is so arranged that at least 1,000 gal. of 60 is pumped to the loading tanks after the 90 has been run. As this oil is only heated to 200 deg., some of the latent brick heat is thus absorbed. If the fire is pulled at this point, the pyrometer shows the temperatures in the empty retort tubes to act as shown in curve I, Fig. 4. This curve is what is usually expected with an average day of 90 oil and the temperatures are not high enough theoretically to cause combustion. However, it is known that higher temperatures do at times exist, and also that certain atmospheric conditions are more favorable to spontaneous combustion than others.

After the 1,000 gal. of 60 (mentioned above) has been pumped to the loading tanks and the fire extinguished, the procedure is to turn off the fuel oil, increase the steam in the firebox and continue to pump cold oil through the retort and into the sump for fifteen minutes. This results in some cooling of the brickwork by the steam and some absorption of heat by the cold oil. With fifteen minutes of this process the temperature of the 60 oil drops to about 150 deg. F. If steam and oil are then stopped, curve II, Fig. 2, shows the action of the heat in the empty retort tubes. These temperatures are unquestionably safe.

Curve III, Fig. 4, shows temperatures obtained after the retort has heated 60 oil for some time, no precaution being taken to cool the furnace as was taken after retorting the 90. Curve IV, Fig. 4, represents similar conditions, except that after pulling the fire and closing the 60 pump, steam was exhausted into the firebox. This did not lower the maximum temperature, but caused it to be reached sooner than before.

It appears that if an explosion is to be caused by retort temperatures after closing the plant, it may be expected in from 30 to 50 minutes. It also appears that practically all possibility of such an explosion from this source can be eliminated (curve II, Fig. 4).

Operating Costs—The oil plant is operated by one man at a salary of $175 per month. He is assisted during the rush hour of the morning and at such times as it is necessary to unload railroad cars to the storage tanks. This assistance will average about two hours per day. The total labor charge for operation is then a man and a quarter plus a portion of the salary of the warehouse foreman. The operation cost for the calendar year of 1928 was:

		Per Cent
Fuel oil	$2,142.00	40.8
Supplies	77.42	1.5
Labor	3,030.54	57.7
	$5,249.96	100.

Supplies include such miscellaneous material as pipe fittings, pump packings, etc. The gallons of oil heated were 1,572,100, which gives a cost per gallon of 0.33c. An analysis of the individual months of the year shows a variation in cost from 0.22 to 0.49c. The labor is practically constant, the supplies negligible and the fuel

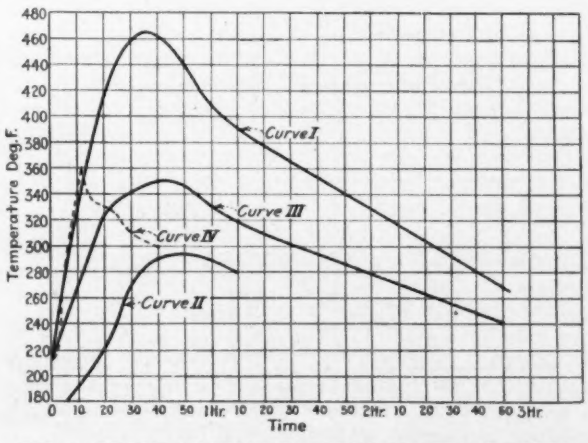


FIG. 4—GRAPH OF TEMPERATURES IN RETORT TUBES

oil consumption does not vary directly as the gallons heated. Hence it is seen that the cost of heating oil per gallon is a question of the quantity passing through the plant; the greater the amount of heavy oil heated the higher the per gallon cost. Some 28 per cent of the oil heated was 90 asphaltic oil.

Much excellent work on this new plant is the result of the efforts of warehouse foreman, H. D. Vreeland, and his oil plant engineer.

Typhoid in Large Cities of the United States in 1928

OF THE 81 cities in the United States having a population of more than 100,000, nine showed no deaths from typhoid fever during the year 1928. These cities head the "honor roll" of 45 cities out of the 81 in the list, "honor roll" being the designation adopted by the *Journal* of the American Medical Association for cities with a typhoid death rate under 2 per 100,000.

TYPHOID DEATH RATES IN THE 81 LARGEST AMERICAN CITIES IN 1928

From *Journal* Am. Med. Assoc., May 18, 1929

Honor Roll (From 0.0 to 1.9 Deaths Per Hundred Thousand)

Duluth	0.0	Cleveland	0.6	New York	1.4
Elizabeth	0.0	Grand Rapids	0.6	Paterson	1.4
Lowell	0.0	Jersey City	0.6	Scranton	1.4
Lynn	0.0	Milwaukee	0.7	Los Angeles	1.5
New Haven	0.0	Albany	0.8	Cambridge	1.6
Springfield, Mass.	0.0	Canton	0.8	Norfolk	1.6
Tacoma	0.0	New Bedford	0.8	Cincinnati	1.7
Yonkers	0.0	Philadelphia	0.8	Columbus	1.7
Youngstown	0.0	Rochester	0.9	Kansas City, Kan.	1.7
Minneapolis	0.0	Detroit	1.0	Providence	1.7
Akron	0.4	Newark	1.0	San Diego	1.7
Chicago	0.5	Oakland	1.1	Spokane	1.8
Syracuse	0.5	Hartford	1.2	Utica	1.9
Worcester	0.5	Des Moines	1.3		
Boston	0.6	St. Paul	1.3		
Bridgeport	0.6	Seattle	1.3		

From 2.0 to 4.9

Jacksonville	2.1	Denver	2.7	Tulsa	3.5
Portland, Ore.	2.1	Lousville	2.7	Indianapolis	3.6
Trenton	2.1	Omaha	2.7	Baltimore	3.8
St. Louis	2.2	Washington	2.7	Camden	4.4
Buffalo	2.3	Salt Lake City	2.9	Fall River	4.5
Kansas City, Mo.	2.3	Richmond	3.1	Wilmington	4.7
San Antonio	2.3	Flint	3.4	Toledo	4.8
Reading, Pa.	2.6	Pittsburgh	3.4		
Dayton	2.7	San Francisco	3.4		

From 5.0 to 9.9

Dallas	5.0	Fort Worth	7.0	New Orleans	7.2
Erie	5.3	Birmingham	7.2	Atlanta	7.4
Houston	6.0				

Above 10.0

Oklahoma City	10.0	Memphis	11.6	Nashville	15.0
El Paso	10.2				

These 45 cities, together with the 36 others in the group, are given in the accompanying table, reproduced from the May 18 issue of the journal named.

That issue gives not only the 1928 typhoid death rates but also those for 1927, for 1926 and for the four quinquennial periods prior to 1926 for the entire 81 cities, arranged by geographical groups. Another table shows that for 74 cities for which figures for the period 1910-28, inclusive, are available, the total deaths from typhoid fell from 4,586 and a rate of 20.58 in 1910 to 627 deaths and a rate of 1.89 for 1928.

Reverting to the table here reproduced, it will be noted that only thirteen of the 81 cities had typhoid death rates in 1928 in excess of five per 100,000, while only four of these had rates above ten. With the exception of Erie, Pa., all these rates above 5 were found in Southern cities. The only Southern city on the "honor roll" is Norfolk, Va., with a rate in 1928 of 1.6 per 100,000, but there are five other Southern cities with rates under five per 100,000.

The geographical divisions used by the *Journal* of the American Medical Association show the following ratings per 100,000 from least to greatest: New England, 0.90; East North Central, 1.10; Middle Atlantic, 1.50; West North Central, 1.65; Mountain and Pacific, 1.92; South Atlantic, 3.72; West South Central, 6.18; East South Central, 7.68.

Regional Planning at Cincinnati

A regional planning commission for the metropolitan area around Cincinnati, Ohio, as organized in March, 1929, is composed of the three county commissioners, representing Hamilton County, and two representatives of each municipality within the region covered by the Regional Planning Commission, which for the present is coincident with Hamilton County. Charles Urban is chairman, Alfred Bettman vice-chairman, and Myron D. Downs secretary. Since its organization, the commission has had under consideration a program for the remainder of the year 1929, and has conferred with a number of city planners as to the methods which should be followed. At present the commission does not cover the Kentucky area within the metropolitan district surrounding Cincinnati, but Covington, Ky., has already appointed a planning commission, and Newport is expected to do likewise, thus making it possible for these areas to co-operate with the Cincinnati commission in the solution of the problems common to this general area.

Protection of Water Supplies in New York State

Court enforcement of orders for the sanitary protection of public water supplies issued by the New York State Commissioner of Public Health is authorized by Chap. 374 of the Laws of New York, 1929, which is an amendment to the public health act of the state. The amendment reads:

When the state Commissioner of Health, after investigation of the condition of any public water supply used for drinking or other domestic purposes, whether maintained and operated by a municipality, water district or private corporation, company or individual, shall certify to the board, corporation, company, officer or person in charge of the maintenance and operation of such water supply that in his opinion such water supply is so polluted or subject to dangerous pollution as to constitute a menace to the public health and shall order reasonable measures to be applied to such water supply for the protection of public health and such municipality, water district or private corporation, company or individual maintaining and operating such water supply shall fail to carry out such order forthwith, any court of competent jurisdiction may, upon the application of the state Commissioner of Health, enforce prompt compliance with such order. Service of the certificate by the state Commissioner of Health as aforesaid shall be made upon the Mayor or Corporation Counsel of the municipality or upon an officer of the water district or private corporation or company as the case may be.

Technical Bulletins on Steel Available

A technical data bulletin service has been inaugurated by the American Institute of Steel Construction, which proposes to issue data in handy reference form at intervals covering subjects relating to structural steel design and fabrication and to the physical properties of steel. The first bulletin has just been issued and is entitled "The Effect of Temperature on Structural Steel." Copies of these bulletins can be secured by writing F. H. Frankland, manager of technical service, American Institute of Steel Construction, Inc., 200 Madison Ave., New York, N. Y.

Delaware River Bridge Traffic Exceeds Expectations

In the Third Year of Its Operation 10,688,820 Vehicles Crossed—Net Receipts, $2,682,082

By Joseph K. Costello
General Manager, Delaware River Bridge Joint Commission

THE Delaware River bridge, between Philadelphia, Pa., and Camden, N. J., completed the third year of operation at midnight June 30, 1929. Both traffic and receipts surpassed all estimates made previous to the opening of the bridge.

During the third year 10,688,820 vehicles crossed. About 85 per cent were private passenger automobiles and pneumatic-tired light delivery trucks upon which a toll of 25c. was charged. Next in importance were 1,290,382 passenger buses, upon the large majority of which a 50c. toll was paid. Of the buses operating over the bridge 95 per cent are of the single-deck type paying 50c., while the comparatively few double-deck buses are charged 75c.

On Sunday, June 23, 1929, a record of 64,332 vehicles crossing in 24 hours was set. The best previous mark was 62,497, made the preceding Sunday. Most of this traffic was concentrated in the hours between 8 p.m. and 12 midnight, when the rush homeward to Philadelphia from the seashore resorts was at its height. The bridge, however, can handle 100,000 automobiles a day without serious overcrowding of its capacity.

TRAFFIC AND RECEIPTS, DELAWARE RIVER BRIDGE, DURING ITS THREE YEARS OF OPERATION, JULY 1, 1926, TO JUNE 30, 1929

	Vehicles Crossed	Average Vehicles Monthly	Average Vehicles Daily	Gross Receipts	Average Receipts Monthly	Average Receipts Daily
First year	7,847,217	653,935	21,500	$2,129,823	$177,485	$5,835
Second year	9,107,679	758,973	24,884	2,668,530	222,377	7,291
Third year	10,688,820	890,735	29,285	3,069,571	255,797	8,409
Totals	27,643,716			$7,867,924		

Distributed Funds

	New Jersey	Pennsylvania	Philadelphia	Total
First year	$905,339.44	$452,669.72	$452,669.72	$1,810,678.87
Second year	1,147,365.24	573,682.62	573,682.62	2,294,730.48
Third year	1,341,041.25	670,520.63	670,520.63	2,682,082.51
Totals	$3,393,745.93	$1,696,872.97	$1,696,872.97	$6,787,491.86

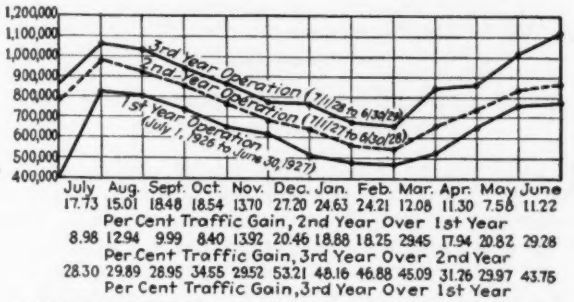
The bridge was opened July 1, 1926. During the first year 7,847,217 vehicles crossed and the gross receipts amounted to $2,129,823.58. The expenses were $312,317.81. The net receipts of $1,810,678.87 were divided in the proportion of 50 per cent to the State of New Jersey, 25 per cent to the Commonwealth of Pennsylvania and 25 per cent to the city of Philadelphia. The agreement between the states for the collection of tolls provides that when each party has been repaid the amount invested in the bridge, together with interest during the cost of construction, the bridge is to be freed to private passenger automobiles.

During the second year the traffic rose to 9,107,679 vehicles and the gross receipts to $2,668,530.75. The expenses were $380,127.17 and the net receipts $2,294,730.48.

Traffic jumped more than one and one-half million cars during the third year. The gross receipts rose to $3,069,571.37, with expenses of $387,488.86. The net receipts were $2,682,082.51.

Prior to the opening of the bridge it was estimated that the first three years of operation would return net receipts of $3,831,250. The actual net receipts distributed to the two states and the city of Philadelphia have amounted to $6,787,491.86.

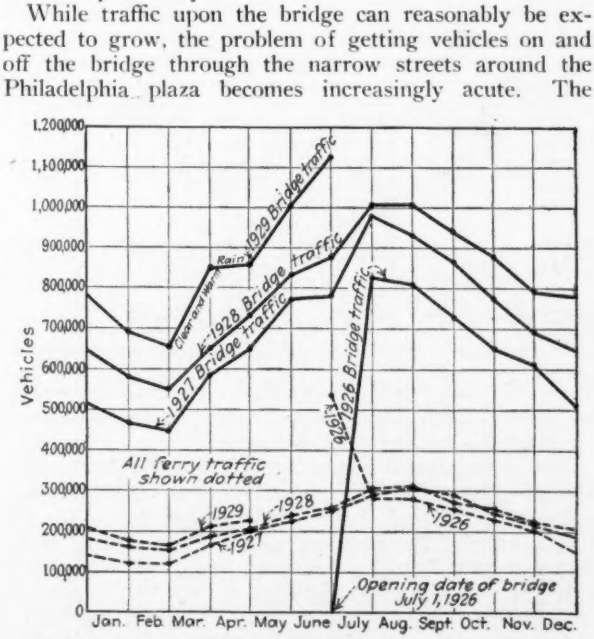
The total amount appropriated for the bridge was $37,462,364.57. Of this there has been spent $36,555,531.30, of which New Jersey has invested $15,870,960.78, Pennsylvania and Philadelphia each $10,342,285.26. There are still pending in the Philadelphia courts a few property claims, and to meet these $100,000 has been segregated by the joint commission. The remaining money available may be spent in the installation of trolley or high-speed lines upon the bridge whenever any corporation finds the proposal of operating cars over the bridge attractive.



MONTHLY VEHICULAR TRAFFIC, DELAWARE RIVER BRIDGE

According to the original estimates the bridge would be freed of tolls by 1946. Now it looks as if this can be accomplished by 1941.

While traffic upon the bridge can reasonably be expected to grow, the problem of getting vehicles on and off the bridge through the narrow streets around the Philadelphia plaza becomes increasingly acute. The absolute necessity of improving the streets is apparently conceded by everyone in Philadelphia, but to date no money has been spent to aid traffic. There is a ray of hope, however, because the loan bill to be submitted to the Philadelphia voters in September will contain an item of $1,000,000 to be spent in the improvement of the approaches to the bridge.



STUDY OF VEHICULAR TRAFFIC, DELAWARE RIVER BRIDGE

Civil Engineers Hold Summer Meeting at Milwaukee

Relation Between Rail and Water Transportation Is Major Subject of General Interest—Meetings of the City Planning, Construction, Waterways and Highway Divisions Held—First Fowler Awards

Engineering News-Record Staff Report

MEETING in a region where the development of inland waterways is of special interest, the American Society of Civil Engineers took the subject of the relation between rail and water transportation as the principal matter for discussion at the general session of its annual convention at Milwaukee, Wis., July 9-12. In addition, the waterways division held one separate session and a joint meeting with the construction division. Other division meetings were those of the city planning, construction and highway groups.

The board of direction assembled at Milwaukee on Sunday and continued its deliberations through Monday and part of Tuesday. Its action was reported in our news pages last week. On Tuesday a local sections' conference was held. As in the case of similar conferences held in the past the representation was largely regional, there being only a scattering of representatives from outside the Central and Lake states. This condition brought up the question of whether such conferences should be recognized frankly as being regional or whether it would be worth while to have the parent society bear the cost of traveling expenses of one delegate from each section to the conference and so make it fully representative. No definite conclusions were reached.

Cleveland Next Summer Meeting Place

Largely as an experiment, the board of direction put up to the local sections' conference the selection of the city in which the 1930 annual convention (summer) should be held, also what subjects would be discussed. Cleveland was selected as the city and the general subjects of railroad terminals and airline consolidation were chosen. As reported in the news pages last week, an effort will be made to have members in neighboring cities assist the Cleveland men in handling the meeting in order to make it regional in character.

On Tuesday morning the convention opened under the chairmanship of W. M. White, president of the Milwaukee Section, and after an address of welcome by the president of the Milwaukee Chamber of Commerce, the president of the society, Anson Marston, delivered his annual address, taking as his subject engineering and engineering education. After reviewing the development of engineering, Dean Marston enumerated five ways in which the American Society of Civil Engineers might aid in improving engineering education. They are as follows: (1) adoption of higher requirements for the inclusion of engineering schools in the society's approved list of such institutions; (2) requirement that non-graduate engineers pass written examinations to show that their training is equivalent to a college training; (3) co-operation with the Society for the Promotion of Engineering Education in the establishment of standard requirements for the degree of civil engineer; (4) aid in the development of graduate engineering courses; (5) study of the possibilities of short-term schools on special subjects where younger men may learn of the experience of older men in their particular field. In this connection he called attention to the fact that the board of direction had sponsored a school for civil engineering teachers to be held at Yale in 1930 similar to the one for mechanical engineers now being held at Purdue University.

Professional and Architectural Awards

At the close of the morning session the first of the Phebe Hobson Fowler professional and architectural awards were made. The professional awards were made as follows: first, to Leonard C. Wason in recognition of his work as chairman of a committee of the Northeastern Section which developed the code of practice subsequently adopted by the society; second, to Lewis B. Stillwell for consolidating the research activities of Engineering Foundation and of the engineering societies; third, to Clarence F. Bell for his work in enhancing the financial status of engineering employees of the city of New York. The architectural awards were as follows: first, to Gustav Lindenthal for the design of Hell Gate bridge at New York; second, to John D. Stevenson for the design of the Beechwood Boulevard bridge (concrete) at Pittsburgh; third, to Edward L. Woodruff for the design of the San Pedro lighthouse.

General Session on Transportation

Rail and Water Transportation—The only general session of a technical nature was to discuss the relation between rail and waterway transportation, but as four of the five speakers listed on the program were advocates of waterways and as they did not finish speaking until time to clear the room for the evening meeting, none of the arguments presented on either side was answered in rebuttal.

The first paper was by Major General Thomas Q. Ashburn, chairman of the Inland Waterways Corporation, the semi-public organization which operates the government barge lines. He presented figures to show that the barge lines were being operated more advantageously each year and with considerable benefit to the shippers. He was followed by E. A. Hadley, chief engineer of the Missouri Pacific Railway, who stated that the enormous expenditures of public moneys on waterways which compete with railways are generally ignored in comparisons of the cost of operating railways and waterways. He pointed out that railroad facilities are ample to handle the freight and that most of the waterway transport simply takes freight which the railroads could carry equally well. The New York Barge Canal was cited as an example of the poor economy of waterway service in general.

Future traffic developments, as of 1950, and their

economic aspects were presented by L. D. Cornish, chief engineer of the Illinois State Waterways Division, and the relation of terminals to water transportation was reviewed by Rufus W. Putnam, of the Maritime Engineering Corporation. The other two papers, by Lieut. Col. George R. Spalding, U. S. A., and W. F. Schultz, consulting engineer, Memphis, were listed as opening the discussion, but in fact were independent and lengthy papers giving further facts in favor of waterway transportation. Colonel Spalding expressed the view that there is something more than mere economics in the federal government's interest in waterways. Its object is to keep open all important highways to the sea regardless of whether they are an economic necessity at the present time. He believes that eventually all our major rivers will be needed for the movement of bulk freight.

City and Regional Planning

Examples of city and regional planning translated into actual accomplishment, together with a legal discussion on the establishment of sovereignty as regards setbacks, formed the basis for the three papers presented at the meeting of the City Planning Division. In a paper on county and regional planning E. A. Howard, supervising engineer, Regional Planning Department, Milwaukee County, described the results being obtained by an official commission set up by the county. Mr. Howard outlined the organization, its legal status, results, plan and scope much as set forth in *Engineering News-Record*, of Apirl 11, 1929, p. 585. In discussion A. J. Rabuck, assistant city planning engineer, Milwaukee, held that since most of the government is already set up in the counties it is naturally the best agency to handle regional work. For instance, any county in Wisconsin has authority to adopt a major street plan under the highway right-of-way widening law. This plan is only deficient, in Mr. Rabuck's opinion, because it stops at political boundaries of cities and villages, although fortunately co-operation has effected the necessary uniformity of action.

William E. O'Brien, city manager, Kenosha, Wis., explained how his city had carried out a city plan after legal authority had been obtained, a survey made, the public educated and finances on the pay-as-you-go principle provided. To carry out the recommended project the administration took action under four classifications, widenings, openings or connections, elimination of jogs and sharp angles, and extensions in unplotted territory. A civic center has been achieved. A grade separation plan has been agreed to with the railroad as to width and number of new openings; four old openings have been eliminated. Both sewer and water utilities have been surveyed to care for the expected growth. When the plan was adopted, in 1922, the total assessment valuation was $55,000,000 and the tax rate 31 mills. In 1928 comparable figures were $72,000,000 and a 29-mill rate. Valuation is 57 per cent of true values in consequence of the reduction. The financial plan is considered sound.

In a highly practical paper on the legal problems involved in establishing setback lines, Clifton Williams, special assistant district attorney, Milwaukee, indicated that street-widening problems of America today are just as much problems of sovereignty as fire fighting, quarantine to prevent the spread of disease, the struggle to prevent crime and the right to construct levees for flood protection. Sovereignty, which is police power, antedates constitutional provisions, and once convinced of its sovereign right to transform horse-and-buggy streets into safe automobile highways the public will confiscate strips for widening without payment for property. The engineer's part in convincing the courts of this right is to compile and present the data showing both the billions of dollars spent to put the streets in a safe condition and the tremendous loss of life and damage from inadequate streets. Once the courts are convinced that widening streets is a function of sovereignty, setback provisions will rest on sound lines and the cost will have to be borne by the individual. Mr. Williams cited cases to prove the feasibility of the above conclusions.

In discussion J. M. Albers, subdivision and zoning engineer, Chicago Regional Planning Association, backed up Mr. Williams' argument and indicated that the legality of regulations creating zoning setback lines was not now questioned and that it should be but a step more to put setbacks for street widening on the same footing. However, it is his opinion that for the present the zoning setback is the best method of protecting future street widenings.

Construction Division—At the opening of the construction division session the chairman announced that the division membership had now reached 1,600. He also stated that a committee on construction plant and methods for steel bridges had been organized with A. F. Reichmann as chairman and that a committee on construction plant and methods for flood control was under consideration.

Construction Plant and Methods

The greater part of the session was given over to the presentation of five reports of committees on construction plant and methods. The report for steel building was presented by A. J. Hammond, Chicago. He also presented the report of the committee on hydro-electric installations in the absence of the chairman. Other reports presented were those on concrete buildings, concrete roads, and concrete bridges. In discussion of the reports, C. W. Haupt, Chicago, stated that committees of the construction division should make recommendations as to points at which high-early-strength concrete can be used. J. P. H. Perry, the chairman, said that in his opinion it would be found that high-early-strength concrete could be used to advantage to offset the losses due to the five-day week in cities where that is in effect.

The second session of the construction division was held jointly with the waterways division. It was given over entirely to the presentation of four papers, there being no time for discussion. Three of the papers were descriptive of specific operations: Some Construction Methods Employed on the Welland Canal, by E. G. Cameron, principal assistant engineer, Department of Railways and Canals, St. Catherines, Ont.; Construction Methods Employed on the Ohio, Mississippi and Missouri Rivers, by F. E. Lamphere, supervising engineer, U.G.I. Contracting Company, Philadelphia; and Construction Plant and Methods on Lake Front Improvements of Chicago, by James E. Cahill, assistant division manager of the Great Lakes Dredge & Dock Company. The fourth paper, by A. E. Holcomb, engineer of the Koehring company, Milwaukee, was concerned with the output of shovels, draglines and bucket cranes under difficult conditions.

Work of Waterways Division

Two long descriptive papers were read, one on the Engineering Features of the Welland Canal by Frank E. Sterns, designing engineer of the Welland Ship Canal, and one on the Engineering Features of the Illinois

Waterway, by L. D. Cornish, assistant chief engineer of the Illinois division of waterways. These occupied the greater part of the separate session of the waterways division. The remainder of the time was given over to a discussion of the future work of the division and to the presentation of the report of the committee on lock valves. This latter report is a summary of experience gained with various types of valves now in use in modern locks throughout this country, including Panama, together with monographs describing them.

Suggestions for future work include a study of economic features of existing waterways, a review of Nicaragua Canal data, Mississippi flood-control works and manuals on piles and piledriving, on cofferdams, on lock gates and on water terminals. It also was suggested that data on the economic features of waterways be prepared in form for popular consumption.

Proper Distribution of Tax Money

Highways—An interesting plan for getting a country-wide expression of opinion on the most equitable distribution of motor vehicle license fees and gasoline taxes is being tried out by the highway division. Beginning with the Dallas meeting, that subject has been scheduled for discussion at four meetings—Dallas, Milwaukee, Boston and New York. After the annual meeting in New York the executive committee hopes to publish a digest of the papers and discussions of the four meetings.

At Milwaukee the subject was presented in two papers, one by George B. Sowers, of the division of engineering and construction at Cleveland, and the other by Prof. H. R. Trumbower, of the University of Wisconsin. Both papers reviewed the general situation in regard to the gas tax, all states now having a tax ranging from 2 to 6c. A growing opposition to considering city streets as something other than a highway when it comes to the distribution of the gas tax was noted by Mr. Sowers and commented on by others in discussion. Mr. Sowers believes that the most equitable distribution of the gas tax money would be on the basis of the traffic handled over each unit of both rural roads and city streets. Such a plan would require frequent traffic surveys.

Professor Trumbower, in commenting on the desire of cities to obtain a larger share of the gas tax money because of the increased cost of pavement maintenance, signals and traffic police, all resulting from motor vehicle traffic, drew attention to the fact that while more than 85 per cent of the gas tax is spent on rural roads, more than 80 per cent of the vehicles using such roads are city owned. He does not believe that any formula for the distribution of motor vehicle revenues will find general application, as most states have their own special problems. Subsequently, in discussion, he stated that cities can levy a special motor-vehicle tax if the burden of street maintenance becomes too heavy on the abutting property owners.

The opinion was expressed by A. R. Hirst, Madison, Wis., that even in states where all the fees go to rural highways the highway commissions are not able to keep them up to the demand. Trunk toll roads, he believes, will be the ultimate solution of the present demand for an opportunity to take advantage of the speed capacity of our motor vehicles. Actual economies in gas and time will, he believes, lead people to use such roads. To the same end, he expects to see a gas tax as high as 10c.

M. W. Torkelsen, on the subject of the distribution of the motor vehicle fees, stated that the Wisconsin law provides a definite allotment for village and city streets varying from $25 per mile in villages to $200 per mile in first-class cities. It is now proposed to remove the personal property tax on automobiles and put an added cent on the gas tax, which will be returned to the local unit for roads and streets.

An independent paper before the highway division by Joseph A. Stansky described the superhighway developments in the Milwaukee metropolitan area.

Special Features

Special features of the convention were an illustrated lecture on animal life of East Africa by Dr. S. A. Barrett, director of the Milwaukee Museum and recently head of the Cudahy-Massee-Milwaukee expedition to East Africa, also trips to the city's sewage-disposal plant and to the plants of the many manufacturers of engineering and construction equipment around Milwaukee. The convention closed with a trip out on Lake Michigan on a car-ferry put at the disposal of the society by the Pere Marquette Railway.

Active Development of Irrigation Works in India

WONDERS in land reclamation and agricultural development which have been and are being accomplished by irrigation in the dry and arid district of the Punjab province in northwest India, are reviewed interestingly in *The Engineer*, of London, from which the following brief particulars are taken. The name Punjab means "the land of the five rivers," and the main source of water is the River Indus, with its five tributaries, the Chenab, Jhelum, Sutlej, Ravi and Beas:

"The engineers have shown what the land could do when the waters of the five rivers were poured upon it. They have fettered the rivers with weirs and have led the gold-producing fluid from them to land formerly desert." In all, about 13,250,000 acres are irrigated by the Indus and its tributaries. But the two great works now in progress of construction in the valley of the Sutlej and on the Indus at Sukkur will add 6,750,000 acres, besides supplying a regular instead of a fitfull supply on some 4,000,000 acres. "Thus the Indus system will soon be responsible every year for 20,000,000 acres of crops worth on a moderate estimate $400,000,000." In addition, there are new projects by the government of the province that will add 5,500,000 acres, while by various extensions and improvements, including a hydro-electric pumping scheme, it is hoped to add still another area of 300,000 acres. Besides this, there is the Haveli project for a great impounding reservoir on the Sutlej to hold up the waters of storms and melting shows on the Himalaya Mountains and distribute them in the winter to serve some 2,500,000 acres. There are possibilities also for many more storage reservoirs.

These several rivers have a surprisingly great variation in flow: the Indus, from 19,000 to a flood of 1,000,000 sec.-ft.; the Jhelum, 4,000 to 577,400; the Chenab, 3,884 to 700,000; the Ravi, 1,272 to 300,000; and the Sutlej in combination with the Beas, 2,057 to 400,000 sec.-ft. And all the above-mentioned development, it is to be remembered, is in but one province, and does not include the great irrigation works of central and southern India. It must be remembered also that these works are for an agricultural people who flock to the new lands when they are made available for cultivation.

Engineering Literature

A Monthly Review of Books and a Listing of New Publications

Principal Stresses in Gravity Dams

REVIEWED BY FRED A. NOETZLI

Consulting Hydraulic Engineer, Los Angeles, Calif.

DIE THEORIE DER GEWICHTSSTAUMAUERN unter Rucksicht auf die neweren Ergebnisse der Festigkeitslehre—Von Dr. Ing. K. Kammuller, Privatdozent an der Technischen Hochschule in Karlsruhe. Berlin: Julius Springer. Paper; 5¼x8¼ in.; pp. 60; 25 line cuts. 5.4 marks.

The author presents in a very clear and concise manner the theory of the internal stresses in gravity dams, based upon the general principles of the theory of elasticity. He gives an interesting historical review of the classical investigations of Levy, Mitchell, Fillunger, Mohr, Wolf and Resal relative to the law of the distribution of stresses in gravity dams. The "law of the trapezoid" for horizontal sections is shown to be theoretically valid for the simple triangular cross-section of gravity dams, but only approximately correct for other cases.

General formulas are developed for computing the principal inclined stresses and maximum shears in the interior of the section. The method is illustrated by a practical example on a dam 210 ft. high built recently in Germany. The author also discusses the important subject of uplift and of the probable manner in which the concrete of a gravity dam would be likely to fail, and he then proceeds to determine the shape of the most probable lines of failure.

In a final chapter is given a theoretical investigation of the necessary spacing of contraction joints in order to avoid shrinkage cracks. For a dam 130 ft. high the author figures a necessary theoretical spacing of about 55 ft., which agrees fairly well with modern American practice of a spacing of about 50 ft.

The Other 90 Per Cent

CIVIL AIRPORTS AND AIRWAYS—By Archibald Black, Air Trarsport Engineer, with the collaboration of a group of nineteen specialists in the different angles of airport construction and equipment. New York and London: Simmons-Boardman Publishing Co. Cloth; 6x9 in.; pp. 238; 77 illustrations; maps and graphs. $5.

Only some 10 per cent of air transport activity is in the air. The remaining 90 per cent is confined to the ground, to airports, landing fields and airline markers. This book, by Archibald Black, one of the pioneers in air-transport engineering, is confined to the "other 90 per cent"—to such things as airport selection, design and construction; to step-by-step methods of providing municipalities with airports; to location, size and preparation of field; to design and erection of buildings. Emphasis is also placed on the equipment for operating the airport and for marking the airways.

Present principles of airport design and construction have been culled from the varied masses of data which have been developed over many years in every branch of technical activity. By and large, the process of development has had the characteristics of a metamorphosis in which the various classes of technical work, civil engineering among them, have, rather by accident, found their proper position. This book attempts to bring together in one volume the information on airports and airways which has accumulated over the past several years and the author accomplishes the task with considerable skill. His procedure is not to give the reader his personal views on every subject but to secure the views of specialists on each particular phase.

The result is a broad yet detailed picture of the present requirements of airport and airway development in which the civil engineer can readily locate the functions he is best fitted to perform. Perhaps as far as new civil engineering methods are concerned he will learn little, for he is already familiar with drainage, highway and grading practices, hangar construction, etc.; in fact, most of such information given in the book is taken from existing familiar specifications. But the civil engineer should benefit from the other chapters and from an excellent appendix which includes such subjects as hangar dimensions, lists of operating and repair equipment, a dictionary of aeronautical terms and the airport-rating regulations of the U. S. Department of Commerce. The book should prove worth while for the civil engineer and constructor who wants to keep abreast of airport development and who appreciates that a knowledge of all phases of the work will give him a better basis upon which to undertake his own technical tasks.

Utility Valuation

VALUATION OF PUBLIC SERVICE CORPORATIONS: Legal and Economic Phases of Valuation for Rate Making and Public Purchase—By Robert H. Whitten, Ph.D. Revised and Enlarged by Delos F. Wilcox, Ph.D., author of "Municipal Franchises," "Analysis of the Electric Railway Problem," "Depreciation in Public Utilities," etc. Second Edition. Vol. I, Physical Property—Just Compensation. Vol. II, Overheads—Intangibles—Depreciation—Rate of Return. New York: The Banks Law Publishing Co. Cloth; 6x9 in.; pp. 2081. $30.

When Dr. Whitten produced the book of which this is a revision and material enlargement, the literature on valuation of the property of utility companies was small and for the most part scattered. There were then only some twenty state regulating bodies. In the fifteen years between the original volume and the present edition (revision completed shortly before Dr. Wilcox' death), all the states but Delaware instituted utility rate regulation bodies. Meanwhile the volume of commission rulings and court decisions has multiplied enormously and there have been some notable changes in the body of governing principle laid down by the United States Supreme Court—to which state courts and commissions must conform so far as they find it possible to interpret the real meaning of the Supreme Court decision as applied to particular cases before them.

The original work was thoroughgoing. The revision is equally so, especially when the vast additional mass of economic and social theory and of court decisions bearing upon utility valuation is considered. Great condensation has been required in the present work, both of some of the material presented in the original edition and of the immense addition since then to the subject.

Of the two present volumes, the first is devoted to physical property and just compensation, and the second to overheads, intangibles, depreciation, and rate of return. If there is any one part of the revised work that promises

to be of more general appeal than the others it is the two long chapters on actual cost and cost of reproduction, which together fill 163 pp. The treatment here, as throughout, is well balanced and has all the more point because of the wide knowledge and experience of Dr. Wilcox. His personality, however, is not reflected so much in any bias he may show toward public interest as against utility interests as in his broad grasp and clear presentation of his subject. Moreover, it must be remembered in the revision, as Dr. Wilcox says in his preface to Dr. Whitten's original work, that "any fault of analysis or interpretation on the part of the author can be corrected from the text."

The usefulness of the work under notice is greatly increased by an extensive table of cases cited, beginning with U. S. Supreme Court decisions, continuing with other court cases, and concluding with rulings of utility commissions. Of even more use to other users of the book than lawyers, and perhaps of more use to them also, is a very full and well-arranged index of 80 pp. Entries are made under topics, names of individual judges, commissioners, and other individuals cited, state courts and commissions. Use of a thin paper brings the 2,100 pp. of the two volumes, including their very serviceable covers, within exactly 3 in. of shelf space. The price of the two volumes seems rather appalling until account is taken of the number of pages and the rather limited sale of even the best of such special publications. It seems safe to predict a large circulation of the book and even more safe to say that those who have occasion to use it will find that it ranks high in the literature of utility regulation and valuation.

Handbook on Street Construction

REVIEWED BY HAROLD M. LEWIS

Executive Engineer, Regional Plan of New York and Its Environs

HANDBUCH DER NEUEN STRASSENBAUWEISEN mit Bitumen, Teer und Portlandzement als Bindemittel—Von W. Reiner, Oberbaurat A.D., Bearatender Ingenieur. Berlin: Julius Springer. Bound; 7x10 in.; pp. 400; 216 line cuts and halftones. 30.5 marks.

This book by a consulting engineer of Berlin is one of several published in Germany during the past two years dealing with street construction. The active interest of Germans in this subject indicates a future activity of highway construction in that country comparable with that which is now taking place in the United States. The author has prepared this handbook on new construction methods of pavements using bitumen, tar and portland cement as the combining agents in the belief that such methods have now reached the close of a definite period of development, which he reviews. It is stated that the book is intended for both the student and the practician, but as it sticks closely to the subject as expressed in the title of the volume it should prove of use primarily for those engaged in actual construction.

All the pavements discussed are classified under two general types—those built by what the author calls the "macadam principle" and those which use the "concrete principle." The former are defined as those which depend on pressure, through rolling, for a consolidation of the surface, which continues, however, to have some voids but becomes still further compacted by the traffic which passes over it. Pavements built under the second or "concrete principle" are those which form a solid slab through its various constituents being bound together by a strong cementing agency which gives the pavement its strength. Some asphalt pavements are classified in the first group, others in the second.

A brief introductory chapter deals in a very general way with the problems, aims and fundamentals of street construction. The main part of the book deals specifically with the composition, testing of materials and methods of construction of the various types of asphaltic, concrete and tar pavements. Seven different types of asphalt are described, each being classified as having a different type or mixture of constituents. The section on concrete pavements draws freely upon American practice, and that dealing with tar pavements is based largely on English and Swiss methods. Special emphasis is placed on the machinery used for the handling and placing of materials and for finishing the pavement surface.

Invention and Discovery

A HISTORY OF MECHANICAL INVENTIONS—By Abbott Payson Usher, Associate Professor of Economics, Harvard University. New York and London: McGraw-Hill Book Co. Cloth; 6¼x9¼ in.; pp. 401; 148 illustrations. $5.

MAN THE MIRACLE MAKER: The Story of Invention—By Hendrik Van Loon. New York: Horace Liveright, Inc. Cloth; 6½x9¾ in.; pp. 252; many black and white sketches and eight color plates. $3.50.

Two books on much the same general subject could scarcely be more different in method of treatment than Usher's History of Mechanical Inventions and Van Loon's Man the Miracle Maker: The Story of Invention. The first is technical and limited not only to mechanical invention but strictly to that, as contrasted with the discovery and use of means at hand; the second is popular, and includes discovery as well as invention. Both center in man and the satisfaction of his needs through new agencies, but Mr. Van Loon's book goes much farther in that way. Each stimulates philosophical thought, but Mr. Van Loon's book will not carry many readers beyond the shallows. For most readers, the technical book should be taken up before the popular one.

Professor Usher, who has the unusual combination of a knowledge of economics, engineering and industrial technology, opens his book with illuminating chapters: A short one on The Place of Technology in Economic History, and a relatively long one entitled The Process of Mechanical Invention. This valuable introductory material is supplemented by a chapter on The Early History of the Pure and Applied Mechanical Sciences. On the border between the introductory matter and the beginning of the history of invention is a fourth chapter, The Mechanical Equipment of pre-Christian Antiquity. The author then takes up Waterwheels and Windmills, and Water Clocks and Mechanical Clocks to 1500 A.D. Next a whole chapter is given to a single man, Leonardo da Vinci: Engineer and Inventor and artist as well. There follows The Machinery of the Textile Industries: 300-1800. A return to timepieces is then made, The Development of Clocks and Watches Into Instruments of Precision: 1500-1800. The final three chapters deal with Production and Application of Power: 1500-1830; Machine Tools and Quantity Production: 1450-1850; Production and Distribution of Power Since 1832. A Bibliography of 100 pp. is given.

Professor Usher's book condenses much information into small space. It is critical without being dogmatic. It promises to be easier reading for the engineer and

industrial technologist than for the economist, except in the first two chapters.

Through his Story of Mankind and other books of popular appeal, Hendrik Van Loon has made a unique place for himself. After a Foreword, there is chapter on Man the Inventor. The body of the book takes up man's discoveries and inventions under Skin to Skyscraper, The Taming Hand, Foot to Flying Machine, The Thousandwise Varied Mouth, The Nose, The Ear and The Eye. That is, man's advances in the arts, the crafts and the sciences, as applied to meeting and increasing his needs, are grouped as indicated.

Mr. Van Loon's sketches, both colored and black and white, add to the interest of the book under consideration, although some of them, like frequent statements in the text, are far fetched.

Tribute and Defense

THE LIFE OF GEORGE CHAFFEY: A Story of Irrigation Beginnings in California and Australia—By J. A. Alexander. With a Foreword by Stanley M. Bruce, Prime Minister of Australia; an Introduction by Dr. Elwood Mead, Commissioner of the U. S. Bureau of Reclamation and formerly Chairman State Rivers and Water Commission of Victoria, Australia; and a Chapter on the Imperial Valley by H. T. Cory. Melbourne, Australia: Macmillan & Co., Ltd. New York: The Macmillan Co. Cloth; 6x9 in.; pp. 382; illustrated by maps, sketches and halftones. $10.50.

George Chaffey—irrigation promoter, engineer and land colonizer in California and Australia—deserves the tribute paid to him in this book. Unfortunately the author has considered it necessary to combine with the tribute much that is in the nature of a defense. This combination was perhaps unavoidable in view of the obstacles with which George Chaffey had to contend in carrying on his successive pioneer irrigation and colonizing projects at Ontario, Calif., Mildura and Renfrew, Australia, and in the Imperial Valley, again in California. Some of the engineers and promoters displaced when Chaffey took up the projects became rivals thereafter. Then there were government officials to contend with who had principles or theories of their own, political or otherwise, which ran counter to Chaffey's plans and who were zealous for turning the Australian enterprises over to public or "trust" ownership, and who were concerned, in America, with government reclamation projects. In defending Chaffey from attacks from these and other quarters his biographer shows a strong bias against government ownership of any kind of revenue-producing public works, hitting hard at both Australians and Americans, including particularly the United States Reclamation Service and other government departments and not overlooking President Roosevelt and his "big stick."

The controversial side of the book is given emphasis here because defense of Chaffey is almost as dominant as praise for his enterprise and for his ingenuity in meeting engineering and financial difficulties. It was the latter, accentuated by hard times in Australia and the inability or unwillingness of water users both here and in the Imperial Valley to make payments due that contributed largely to the defeat of Chaffey in his Mildura and Imperial Valley projects.

A natural born engineer, taught only in the school of experience, and a man of vision, was Chaffey. At Ontario, Calif., he did pioneer irrigation work, both in bringing water to the desert and in binding together land and water ownership. This policy was introduced in Australia. What Chaffey seems to have lacked, at least until late in his career, was full ability to safeguard his own interests in making basic contracts. At least this biography so indicates. The volume contains strong words of admiration of Chaffey and tribute for his work in Australia, not only in the Foreword by the Prime Minister of Australia but by earlier and notable Australian statesmen, including Alfred Deakin. Commendation for Chaffey is also contained in the contributions by Elwood Mead and H. T. Cory.

For the general reader, even restricting that term to those interested in land reclamation and settlement, the book is overdetailed; but judicious skipping of local and family details is easily possible, while those who wish for the details will be glad of the opportunity to select such of them as they desire.

Revision of Creager's Masonry Dams

ENGINEERING FOR MASONRY DAMS—By William Pitcher Creager, M.Am.Soc.C.E. Second Edition. New York and London: John Wiley & Sons, Inc. Cloth; 6x9 in.; pp. 294; 116 illustrations and folding plates. $4.

In this revised edition of a book published in 1917 the author has added new chapters on arch dam design and on flood flows, as well as material on outlet control and flood gates. Data gathered by the author for use in the hydro-electric handbook, of which he is joint author with Joel D. Justin (see *Engineering News-Record*, April 21, 1927, p. 658), has been used in the revision of this book. The new chapter on flood flows contains a valuable tabulation of unusual flood discharges of rivers in the United States.

Publications Received

CHLORINATION continues to be the subject of many papers before technical societies. Among those recently reprinted in separate form are Odor Control by Chlorination, by R. F. Goudey, and Creamery Waste Odor Control, by E. A. Reinke, both reprinted from the *Proceedings* of the California Sewage Works Association; Chlorination of Deep Well Supply for Taste and Odor Removal, by M. F. Price, and Chlorination of Coagulated Water, both included in a reprint from the *Journal*, American Water Works Association. Each pair of papers just mentioned may be obtained from Wallace & Tiernan Company, Inc., Newark, N. J. Another reprint from *Journal*, A.W.W.A., is Chlorinated Copperas—a New Coagulant, by L. L. Hedgepeth and N. C. and William C. Olsen. A more general paper on Use of Chlorine in Water Purification, by George C. Bunker, Ancon, Canal Zone, has been reprinted from the *Journal*, American Medical Association.

ENGINEERING RESEARCH at the land grant colleges and universities in the United States is covered thoroughly in a 98-p. paper-covered booklet edited by R. A. Seaton, secretary of the engineering experiment station committee of the Association of Land Grant Colleges and Universities. Data contained in the booklet were submitted by directors of the experimentation and deans of engineering of the various land grant institutions and were rechecked from the proof sheets. The book, therefore, provides a complete and accurate summary of the administration, organization, funds, employees, channels of publication, bulletins and circulars issued, live research projects and other data on engineering research in 38 definitely organized engineering experiment stations. Copies may be obtained at $1 from R. A. Seaton, Dean and Director, Kansas State Agricultural College, Manhattan, Kan.

INDUSTRIAL ACCIDENTS and their prevention was taken up by the International Labour Conference at Geneva during the 1928 session, with the result that a questionnaire was sent to the participating governments as to the nature of proposals which might be submitted to the 1929 session. Replies from 26 countries are published in a 219-p. report issued by the International Labour Office at Geneva, Switzerland. Besides the replies to the questionnaire, the booklet gives a general survey of the industrial accident problem in the light of these replies, a résumé of the conclusions reached and the text of two recommendations and one convention which have been submitted to the 1929 conference.

PUBLIC HEALTH WORK in all parts of the world, as carried on by the Rockefeller Foundation, is summarized in a review for 1928 by George E. Vincent, president of the foundation. While

devoted chiefly to the year 1928, the work of the foundation since its inception sixteen years ago is also outlined briefly. The 54-p. illustrated booklet gives an account of the expenditure, during 1928, of $21,690,738.

MOTOR TRUCK SERVICE on the highways as a substitute for work trains to handle men and materials in railway maintenance work on track and bridges, is the subject of an extended committee report in the 1928 *Proceedings* of the American Railway Bridge and Building Association. The committee suggests also the use of special motor trucks with flanged wheels to operate on the track, and refers to such a case described in *Engineering News-Record* of Feb. 23, 1928, p. 328. Other subjects include: (1) precast concrete slabs for bridges and track crossings; (2) jacking pipes through fills; (3) co-operation between the stores department and field forces in handling supplies; (4) water station service, and (5) emergency work on railroads. ($2; from C. A. Lichty, Secretary, 319 North Waller Ave., Chicago.)

New Books and Revised Editions

[*Those desiring copies of the books listed below or mentioned elsewhere in this section should order them from the publishers or from their local booksellers.*]

ALGEBRA for Secondary Schools Based on the Worded Problem—By Stephen Emery and Eva E. Jeffs, Erasmus Hall High School, Brooklyn, N. Y. New York: E. Van Nostrand Co., Inc. Cloth; 5x8 in.; pp. 626; 73 line cuts.

BAREMES pour le calcul des Poutres — Solives — Linteaux—Poitrails—Chevrons, etc. en bois, en acier poutrelles et rainés. Poteaux en bois et en acier poutrelles et rainés. Colonnes en fonte pleines et creuses. Renseignements divers. Calculs a la Portée de Tous Sans Formule Algebrique par Simple Multiplication—Par P. Turbat. Paris: Dunod, 92 Rue Bonaparte (VI). Paper; 6x10 in.; pp. 52; tables.

Simplified formulas and tables for the design of beams, joists, rafters, columns and similar elements in timber and steel.

BIJDRAGE TOT DE KENNIS VAN DEN INVLOED VAN DE GETIJBEWEGING OP DE STIJGHOOGTE VAN HET GRONDWATER—Door Ir. J. H. Steggewents, m.i., Hydroloog bij het Rijksbureau voor Drinkwatervoorziening. Mededeeling No. 9. 'S-Gravenhage, Holland: Rijksbureau voor Drinkwatervoorziening. Paper; 7x9 in.; pp. 63; 14 line cuts.

Investigations at the site of a new lock at Flushing, Holland, revealed the existence of nearly impervious layers of clay and peat dividing the groundwater into different basins, the pressure of which varied with tide levels and characteristics. Formulas are worked out in this booklet expressing this relation.

THE BITUMINOUS SANDS OF ALBERTA. Part III, Utilization—By K. A. Clark. Report No. 18 of the Scientific and Industrial Research Council of Alberta. Edmonton, Alta.: W. D. McLean, King's Printer. Paper; 7x10 in.; pp. 33; 2 line cuts.

THE CHLORINATION OF SEWAGE AND EFFLUENTS—By F. W. Mohlman, E. Hurwitz and C. C. Ruchhoft. Reprinted from the Proceedings of the Eleventh Texas Water Works Short School, College Station and Bryant, Tex.

ELECTRICAL UTILITIES: The Crisis in Public Control—By William E. Mosher, editor; Finlay G. Crawford, Ralph E. Himstead, Maurice R. Scharff, A. Blair Knapp, Richard L. Schank and Louis Mitchell. Under the auspices of School of Citizenship and Public Affairs, Syracuse University. New York and London: Harper & Bros. Cloth; 6x9 in.; pp. 335. $4.

THE ENGINEERING INDEX, 1928 (Two Volumes). Cloth: 8x10 in.; pp. 2,000 (approximately). New York: American Society of Mechanical Engineers. $125.

EPOCHS IN AMERICAN BANKING—By Noble Foster Hoggson. New York: John Day Co. Bound; 6x9 in.; pp. 250 plus index; 27 illustrations.

THE HANDBOOK OF CORPORATE MANAGEMENT AND PROCEDURE—By Earl A. Saliers, Ph.D.; formerly Professor of Accounting, Northwestern University and sometime Assistant Professor of Accounting, Yale University. New York and London; McGraw-Hill Book Co., Inc. Cloth; 5x8 in.; pp. 1237; 457 forms. $7.50.

INTERNATIONAL AIRPORTS—By Stedman S. Hanks, Lieutenant Colonel, Air Corps Reserve. New York: Ronald Press Co. Cloth; 6x9 in.; pp. 195; 46 line cuts and halftones. $5.

INVESTIGATION OF HEATING ROOMS WITH DIRECT STEAM RADIATORS EQUIPPED WITH ENCLOSURES AND SHIELDS—Conducted by the Engineering Experiment Station, University of Illinois, in co-operation with the National Boiler and Radiator Manufacturers' Association and the Illinois Master Plumbers' Association—By Arthur C. Willard, Professor of Heating and Ventilating and head of the Department of Mechanical Engineering; Alonzo P. Kratz, Research Professor in Mechanical Engineering; Maurice K. Fahnestock, Special Research Associate, and Seichi Konzo, Research Graduate Assistant, University of Illinois. Bulletin 192, Engineering Experiment Station. Urbana, Ill.: University of Illinois. Paper; 6x9 in.; pp. 69; 39 line cuts and halftones; 5 tables. 40c.

MANUAL OF SECOND AND THIRD ORDER TRIANGULATION AND TRAVERSE—By the late C. V. Hodgson, Hydrographic and Geodetic Engineer, U. S. Coast and Geodetic Survey. Special publication No. 145 of the Coast and Geodetic Survey. Washington, D. C.: Government Printing Office. Paper; 6x9 in.; pp. 226; 99 halftones and line cuts; many tables. 60c.

This publication contains a description of the specifications and criteria for second and third order triangulation, traverse and base measurement, with detailed instructions for field and office operations and specimens of field records and office computations. While written particularly to meet the needs of the Coast and Geodetic Survey, the treatment of the subject is sufficiently broad to make the manual of value to any engineer who may be called upon to execute second or third order horizontal control. The section on instrumental adjustments and errors and the discussions of the sources of error on triangulation and traverse are written in considerable detail.

A MANUAL OF ENGINEERING DRAWING for Students and Draftsmen—By Thomas E. French, M.E., D.Sc., M.Am.Soc.M.E.; M.S.P.E.E., Professor of Engineering Drawing, Ohio State University. Fourth edition. New York and London: McGraw-Hill Book Co., Inc. Cloth; 6x9 in.; pp. 466; 733 line cuts. $3.

This fourth edition of a standard work has been revised to conform to the new standards established by the American Engineering Standards Committee. The revision has also given the opportunity of expanding some of the subjects in the text, and of adding new illustrations and problems. The number of working drawing problems has been increased from 76 to 120, and the number of pages from 409 (third edition) to 466.

MEN AND MACHINES—By Stuart Chase. Illustrated by W. T. Murch. New York: The Macmillan Co. Cloth; 5½x8½ in.; pp. 354; illustrated. $2.50.

PROPERTIES AND MANUFACTURE OF CONCRETE BUILDING UNITS—By Frank A. Hitchcock, engineer, and John R. Dwyer, associate engineer, U. S. Bureau of Standards. Circular 304 of the Bureau of Standards. Washington, D. C.: U. S. Department of Commerce. Paper; 7x10 in.; pp. 49; 8 halftones.

Discussing the essential features of concrete brick, block and building tile, and giving information on their manufacture. Contains a bibliography and standard specifications.

RELIEF FOR THE RATEPAYER: An Explanation of the Local Government Act, 1929—By the Rt. Hon. Sir Kingsley Wood, M.P., with an introduction by the Rt. Hon. Neville Chamberlain, M.P., Minister of Health, and a foreword by the Rt. Hon. Stanley Baldwin, M.P., Prime Minister. London: Ernest Benn, Ltd. Paper; 5x7 in.; pp. 134. 1s. 6d.

RÉSISTANCE DES MATÉRIAUX Appliquée aux Constructions: Méthods Pratiques par le Calcul et la Statique Graphique. Tome II—Par Ernest Aragon, Ingénieur des Arts et Manufactures. Ingénieur D'Etudes de Ponts, Constructions Métalliques et Travaux Publics. Deuxième édition, revue par Paul Chambran, Ingénieur Des Constructions Civiles, Licencié ès-Sciences. Paris: Dunod, 92, Rue Bonaparte (VI). Paper; 5x7½ in.; pp. 734; many line cuts.

SALES ENGINEERING: A Text on Technical Selling for Students, Sales Engineers and Managers—By Pearl Edwin Thomas, B.Sc., formerly engineering faculty, Pennsylvania State College; Advertising Manager, Armstrong Cork & Insulation Company; Sales and Advertising Manager, Cork Import Corporation, etc. Chicago: P. Edwin Thomas, 205 West Wacker Drive. Bound; 4x7 in.; pp. 216. $1.

The four major divisions of this book take up the training of the sales engineer; writing in modern business; business law and contracts; and sales engineering in its different phases. Two appendices outline additional references and the trend of the colleges to give instruction in sales engineering.

SOME UNDERGROUND WATERS OF WEST TEXAS and Their Geological Horizons—By H. N. Roberts, M.Am.Soc.C.E. College Station, Tex.: Texas section, Am.Soc.C.E. Paper; 6x9 in.; pp. 37; line cuts and tables.

Chapter I gives the results of chemical analyses of the waters of various formations in Texas; the rest of the pamphlet describes the geological features of these formations.

SVENSKT FURUVIRKES HALLFASTHETSEGENSKAPER OCH DERAS BEROENDE AV FUKTIGHETSHALT OCH VOLYMVIKT—Av Ragnar Schlyter och Gustav Winberg. Ingeniorsvetenskapsakademiens, Handlingar 92. Stockholm: Svenska Bokhandelscentralen A.-B. Paper; 6x9 in.; pp. 140; 61 halftones and line cuts; 39 tables.

A treatise on the strength of Swedish redwood timber (pine) and its dependence on moisture content and apparent specific gravity. Although the text is in Swedish, most of the chapter headings, captions and tables also contain English equivalents, so that the pamphlet can be used intelligently by those unfamiliar with the Swedish language.

TESTS OF FREIGHT CAR DRAFT GEARS—By W. E. Gray, Test Engineer, and C. W. Messersmith, assistant, Engineering Experiment Station, Purdue University. Bulletin 35, Engineering Experiment Station. Reprint of the Report of Draft Gear Tests for the American Railway Association. Lafayette, Ind.: Purdue University. Paper; 6x9 in.; pp. 313; many halftones, line cuts and tables.

YOU CAN MAKE IT: Practical Uses for Second-Hand Boxes and Odd Pieces of Lumber. Vol. 1. Report of the subcommittee on Uses for Second-Hand Boxes and Odd Pieces of Lumber of the National Committee on Wood Utilization. Eleventh report of a series on the marketing and use of lumber. Washington, D. C.: Government Printing Office. Paper; 6x9 in.; pp. 52; 105 line cuts. 10c.

Prepared for distribution to boys' organizations to help eliminate the waste resulting from the burning of wooden containers.

WAGES AND HOURS OF LABOR: Common Street Laborers. Bulletin 484 of the U. S. Bureau of Labor Statistics. Washington, D. C.: Government Printing Office. Paper; 6x9 in.; pp. 44; tables. 10c.

Letters to the Editor

Venturi Meters and Standing Wave Flumes

Sir—With reference to my friend Clemens Hershel's main contention in his "A Farewell Word on the Venturi Meter" in your issue of April 18, p. 636, I am in complete agreement—for pipe-line discharge measurements the Venturi meter is unrivaled. When, however, the problem is the measurement of open channels "standing wave flumes" have several important advantages because: (*a*) They cost considerably less; (*b*) they have a wider range; (*c*) only one reading is required; (*d*) they can be designed to give proportional supplies—that is, do not interfere with normal regime; (*e*) they can be combined with road bridges or falls.

The standing wave flume has been perfected in India by E. S. Cramp, of the Punjab Public Works Department. It is so designed that it discharges according to the broadcrested weir formula $Q = C\ [3.09\ D^{1.5}]$, C varying from unity for 1,000 sec.-ft. to 0.97 for 2 sec.-ft. (See "Notes on Standing Wave Flumes and Flume Meter Falls." Technical Paper No. 15, Bombay Public Works Department, obtainable from the High Commissioner for India, 42 Grosvenor Gardens, London, S.W. 1, for 4½ shillings.)

C. C. Inglis,
Superintending Engineer,
Irrigation Development & Research Circle,
Poona, India.

What the Delaware River Compact Does

Sir—On p. 1044 of the June 27, 1929, issue of *Engineering News-Record* you published a letter of Benjamin Franklin, under the heading "The Tri-State Delaware River Compact." To anyone familiar with the situation and the terms of the proposed compact it is evident that Mr. Franklin misunderstands and confuses a constructive measure vital to the future welfare of three states.

In so important a matter as this it is essential to keep to the facts. Without taking space here to reply to the opinions expressed by Mr. Franklin, with which I do not agree, please permit me, as one of the engineers who had a part in the negotiation and drafting of the form of compact unanimously agreed upon by commissioners representing all three states and signed by them on Jan. 13, 1927, to correct certain erroneous statements in Mr. Franklin's letter, as follows:

According to Art. IV of the compact, all waters of the Delaware River watershed above Trenton would become subject to the jurisdiction of a commission. There are several important streams above Trenton whose watersheds are entirely within the limits of the State of Pennsylvania and which would be affected by Art. IV. . . . The control of these streams is now vested in the Department of Forests and Waters at Harrisburg. Under the compact, control would be transferred to a commission representing three states, of which Pennsylvania is only one, while the interests of the two others are more or less common and even might at times become antagonistic to this state.

Speaking of the upper Delaware and Tohickon Creek having been studied as possible sources of supply for Philadelphia, and the tributaries of the Lehigh River furnishing the water supply for the growing municipalities in the Lehigh Valley basin, Mr. Franklin states:

. . . after the compact is ratified, no municipality within these areas can either increase its water supply or acquire a new local source without the approval of the Tri-State Commission. . . .

Summing up what he considers to be three "serious disadvantages to Pennsylvania," Mr. Franklin concludes:

(3) The surrender by the State of Pennsylvania of its present control of very important tributaries of the Delaware River, which are entirely within the state limits, to a commission of which a majority may not be friendly to the welfare of the state."

Article IV of the proposed compact, to which Mr Franklin refers, reads as follows:

Subject to the duties and obligations imposed by this compact, any administrative department or political subdivision authorized in that behalf by or under the laws of any signatory state, or any corporation, partnership, association or person hereafter so authorized, may exercise the rights and privileges herein conferred on such state in conformity with such other terms and conditions as that state may impose and under such further requirements as the commission may prescribe in the exercise of its authority under this compact.

This article, it may be observed, relates solely to the exercise of rights and privileges conferred by the compact, and contains nothing to warrant the interpretation placed on it by Mr. Franklin. The nature of these rights and the powers and duties of the commission are defined in the other articles. To get at the meaning of the compact, these articles must be considered as parts of one whole.

Under Art. IV these rights and privileges are conferred on the respective states as states, and within the bounds of any state the jurisdiction over Delaware River waters thus conferred automatically is exercised by the departments in the respective states having jurisdiction over intrastate waters. When, for instance, a municipality or a corporation desires to proceed with a development in the Delaware basin, application will be made to that state's department in the normal way. The only difference in procedure is that matters pertaining to the use of the channel must be taken up also with a Tri-State Commission so that such matters may be co-ordinated with the other uses of said channel; also, notice of development for diversion from any tributary must be filed with the commission for purposes of record (Art. X).

So long as questions relating to the use of the Delaware River are left undetermined, the drainage area of that stream remains a sort of "no man's land" and any development involves legal complications. The purpose of the compact is to establish such rules and provide such safeguards and facilities of co-ordination that each state may proceed with necessary developments in an orderly manner.

To this end, under Art. V, each state is given the right to divert a stated definite amount of water, which amount was determined in accordance with Art. I "for the purpose of meeting present and reasonably prospective needs." Under Art. VI each state is given complete control of the tributaries of the Delaware River within its bounds subject only to certain reserve flows and limitation as to the total amount of water which may be diverted. Diversions from the channel of the Delaware River, however, involving simultaneous activities by users in the different states, are placed under the mild supervision of a commission (Art. VII) on which each state is represented and a unanimous vote is required of the states entitled to vote thereon, New York having no vote on matters pertaining only to the lower basin (Art. XIX). In like manner, under Art. IX "each signatory state may build dams in the channel of the Delaware River upon such terms and conditions as the commission, *after hearing*, may prescribe," but such structures must "be built so as to conform to the requirements relating to physical construction and safety in the state or states in which they are located." "Whenever, by this compact, provision is made for action by the commission *after hearing*, notice of such hearing shall be given to the Governor of each state at least ten days before the date set for such hearing" (Art. XIX, Sec. 9). Finally, "Notwithstanding anything contained in this compact, each state may institute any action or proceeding at law or in equity for the enforcement or protection of its rights or the rights of its citizens accruing under this compact or otherwise" (Art. XX).

In the light of the foregoing summary, the intent and meaning of Art. IV should be perfectly clear. No superstate or all-powerful commission is set up. The proposed compact is simply an agreement entered into by the states of New York, New Jersey and Pennsylvania whereby they define their rights in the Delaware basin, reserve as much direct control as possible to the respective states, and refer only matters of common interest to a commission, action by which can be taken only by unanimous consent of all three states and from which commission approval or consent is required only in matters pertaining to the channel of the Delaware River.

As regards the effect of the compact on watershed communities, all such communities are free to continue as at present without any new restrictions. Any municipality may either increase its water supply or acquire a new local source without coming under the provisions of the proposed com-

pact so long as the water is returned into the channel of the Delaware River within a distance of 12 miles, or if the water is taken from a tributary it is "returned into the channel of the Delaware River either above the point at which the tributary enters said channel or within a distance of 12 miles below the point" (Art. II, Sec. 11). This provision was purposely so drawn as to exempt watershed communities from the operations of the compact in so far as possible.

Boonton, N. J., July 5, 1929. CHARLES F. BREITZKE, Consulting Engineer.

The Proposed Railroad Construction in Northern California

Sir—I have noted that the proposed railroad construction in northern California connecting the Great Northern and Western Pacific railways has been discussed somewhat in *Engineering News-Record*, April 25, 1929, p. 659, and in the issue of May 30, 1929, p. 882. If your space permits, I should like to complete the discussion by supplementing the statements in the latter issue.

The main contentions there are that the proposed construction will be considerably longer between points to be served than are existing Southern Pacific lines (implying apparently that the line will thereby be precluded from affording effective competition) and that the proposed line is unnecessary from a military standpoint because the Southern Pacific is now constructing a line from Klamath Falls to Alturas which will afford a second north and south route through Alturas and Fernley, Nev., available for military defense.

Referring first to the military situation, I should like to point out that the points where the Great Northern-Western Pacific route and the Southern Pacific route through Alturas and Fernley would come together are Klamath Falls on the north and Sacramento on the south. Between these points the distance via the Southern Pacific through Alturas and Fernley is 466.1 miles and via the proposed Great Northern-Western Pacific route 338 miles. The Southern Pacific route between these key points is 128 miles (or more than 37 per cent) longer than the proposed Great Northern-Western Pacific route, indicating that it would afford a very roundabout route for urgent military operations in the event of an interruption of traffic over the Southern Pacific Sacramento Valley line.

The writer of the letter in your issue of May 30 states that the "proposed Great Northern-Western Pacific line is in all instances considerably longer between points which it proposes to serve than are existing Southern Pacific lines." This is an incorrect statement. On all shipments moving from Sacramento and the important valley points south of Sacramento (the heart of the producing section of California) to Klamath Falls, central Oregon, the great "inland empire" of eastern Washington and points in Canada, Idaho, Montana and North Dakota through Spokane, the proposed Great Northern-Western Pacific route is not "considerably longer." On the contrary, it is somewhat shorter than the movement via the shortest Southern Pacific route. The shortest Southern Pacific route is through Klamath Falls and thence north and east along the same route used by the Great Northern, so that a comparison of distances from Sacramento and San Joaquin Valley points to the northern territory mentioned is governed by the distance to Klamath Falls. From Sacramento to Klamath Falls the distance is 3 miles less and from Stockton to Klamath Falls 7 miles less via the proposed Western Pacific-Great Northern route and from Fresno to Klamath Falls it is 6 miles less via the Santa Fe-Western Pacific-Great Northern route than via the shortest Southern Pacific route.

However, the importance to the public of the proposed connection between the Great Northern and Western Pacific does not depend upon a difference of a few miles one way or the other in the length of the route. The Southern Pacific itself has demonstrated that a route with substantially longer mileage can furnish effective competition. Its own route from Portland to Chicago through Roseville, Calif., is 2,794 miles, as compared with the short route from Portland to Chicago via the Great Northern of 2,245 miles, a difference against the Southern Pacific of 549 miles, yet the Southern Pacific actively competes for both passenger and freight traffic between Portland and Chicago.

Regardless of any difference in distance, the proposed route will furnish a competing connection (the only one on the Pacific Coast) for interchange of traffic between the lines of the Great Northern, Northern Pacific, and Chicago, Milwaukee, St. Paul & Puget Sound roads on the north and the Western Pacific, Denver & Rio Grande, Santa Fe, and Missouri Pacific on the south. The great collecting and distributing systems of these independent lines in the north and south are now entirely dependent upon the Southern Pacific for an interchange of their traffic on the Pacific Coast. As the Southern Pacific is the principal competitor of the southern lines and as it is often to its interest to divert freight and passengers from the northern route to its central or southern routes on which it enjoys larger divisions of the revenue, it would in many instances be contrary to its best interests to facilitate this interchange by favorable rates or convenient connecting service. If the north and south sections and the independent railroads serving them must depend for interchange upon a connection over trackage other than their own, it would seem highly desirable that they be afforded alternative routes, which would be forced to compete with each other for the interchanged traffic by offering favorable rates and divisions and convenient connections. Regardless of comparative distances, the bridging of the short gap of 200 miles separating the Great Northern and Western Pacific would afford the only opportunity for complete competition from origin to destination in the routing of traffic interchanged on the Pacific Coast between the independent lines in the north and those in the south.

St. Paul, Minn., June 11, 1929. F. G. DORETY, Vice-President and General Counsel, Great Northern Railway Company.

Dislikes Illinois Waterway Editorial

Sir—The editorial in *Engineering News-Record*, May 30, 1929, p. 854, entitled "A Survival of Waterway Propaganda," referring to the Illinois waterway and inclusively to the Lakes-to-the-Gulf waterway, asks, "What justification existed for this undertaking?" The editorial then proceeds to answer its question by a series of innuendos about "waterway propaganda," "lightly voted from reflex emotions," "the undertaking was unwarranted," etc. You state your own adverse opinion without reference to any possible redeeming facts. You ignore the studies of engineers like Cooley, Randolph and Barnes. You fail to note the commercial traffic investigations of the Illinois Chamber of Commerce or the Chicago Association of Commerce. You fail to note the indorsement of the U. S. Army Engineers and that the government is now at work on the lower Illinois River. You pass by President Hoover's indorsement.

You emphasize the fact that the state requires $5,000,000 more to complete the upper Illinois section. You do not note that 80 per cent of the work has been completed on a cost estimate made twenty years ago when unit prices were 25 to 100 per cent lower.

Illinois, in what you term "a gesture of independence and rebellion," has donated to the nation a ship canal and $20,000,000 on a Lakes-to-the-Gulf waterway. Apparently she should now be punished for asking the nation for $5,000,000.

I take no umbrage because you differ with me and many other people of the Middle West on a question of economic policy. You may think we are wrong in wanting a Mississippi outlet to the Gulf to obviate the commercial handicap imposed by the Panama Canal. That is your privilege. I do condemn the editorial as dogmatic statement, which could not be made by a fair consideration of all the facts.

The value of any engineering project is subject to the different forecasts of the prophets. If the prophet be an engineer he should give consideration to all the data. Whatever your prophetic conclusions may be, the Illinois waterway does not warrant the indictment you would give to a confidence game.

Chicago, Ill., June 4, 1929. LEROY K. SHERMAN, Randolph-Perkins Company.

News of the Week

N. Y. Public Health Council Bars Cellulose Nitrate Film

Following the Cleveland hospital catastrophe of this spring and a similar fire in an Albany hospital a year ago, a special committee was appointed by acting Governor Lehman of New York to investigate the hazard attendant upon the use of cellulose nitrate X-ray films in institutions and the State Public Health Council has adopted a rule amending the Sanitary Code, effective Sept. 1, reading: "The sale or distribution of cellulose nitrate film for X-ray purposes is hereby prohibited."

The action of the council has the effect of law outside of New York City. It is expected similar action will be taken there by the Fire Department.

The special committee found that the use and subsequent storage of cellulose nitrate film in institutions caring for patients or other inmates constitutes a serious danger to health and life.

Western Society Absorbs Illinois Structural Engineers

About twelve years ago the Structural Engineers' Association of Illinois was organized, following the passage of a state law requiring the licensing of such engineers. In recent years the association has been inactive, and it has been felt that it might appropriately affiliate with the Western Society of Engineers, especially as the latter was instrumental in securing the passage of the law and is interested in seeing that its provisions are carried out. Negotiations have resulted in the association surrendering its charter, joining its members the Western Society, which has agreed to look after the interests of registered structural engineers.

Indiana Architects Law Held Not Applicable to State Buildings

James M. Ogden, Attorney General of Indiana, in a recent ruling stated that the new law passed by the 1929 state legislature requiring that a registered architect prepare plans on all large building projects did not apply to state institutions. The superintendent at the state reformatory at Pendleton asked the Attorney General whether it would be necessary to employ a registered architect in connection with the construction of a $30,000 building for housing reformatory officers. The building will be erected with prison labor and the superintendent of construction of the reformatory staff designed the plans for the structure. The ruling, while for a comparatively small structure, will set a precedent which likely will be followed in most instances by the state in its public construction.

Earthquake-Resistance Construction Reviewed for Seismologists

Convention Papers Show Trend Toward Provision Against Shocks in Design of Structures

PAPERS dealing with methods of making structures earthquake-proof constituted one-half the program at the convention of the Seismological Society of America held in Berkeley, Calif., June 20. These papers included a discussion of gravity dam design to resist earthquakes, by S. B. Morris, chief engineer, Pasadena Water Department; a consideration of flexible columns for first-story construction, by R. R. Martel, of the California Institute of Technology; a paper on the earthquake-resistance features of the new Southern Pacific Suisun Bay railroad bridge, by C. R. Harding, engineer of standards; a preliminary report on the new California building code, by H. D. Dewell; and a discussion of earthquake-proof design from the underwriters' point of view, by H. M. Engle, engineer for Pacific Coast Fire Underwriters.

The general trend of opinion, as shown by these papers, unmistakably indicated the abandonment of the once prevalent policy that either ignored earthquake possibilities in design consideration or added features based on arbitrary assumption, and the adoption of a new attitude that would provide construction actually designed to resist earthquake shocks of an intensity for which it would be reasonable to design.

Two papers discussing the earthquake hazard in regard to water distribution and fire protection systems emphasized duplication of facilities, rather than design for resistance, as the chief protection.

Pasadena Dam

A modification in the design of a proposed concrete gravity dam 365 ft. high for water supply at Pasadena, Calif., resulted from extensive geological reports that conceded the possibility of earthquake shock but gave rather vague forecasts as to the earth-movement intensity to be expected. Forced to a definite assumption for a basis of design, the engineers adopted a figure of $g \div 10$, or an acceleration of about 3.3 ft. per second per second, which was considered conservative because of the dense solid rock at the dam site. The calculations assumed the resulting force acting in the same direction as the water pressure with the reservoir full; they required a slight increase in base width. Analyses were also given to show that for assumptions of higher values of acceleration, such as would be required for less favorable foundation conditions, large increase in base width would result. Consideration of an earthquake force acting in the opposite direction when the reservoir was empty was deemed an unnecessary precaution, since any damage in this case would not result in floods.

Suisun Bay Bridge

The earthquake-resistant features of the new Southern Pacific $12,000,000 railroad bridge, with pier depths of more than 200 ft. and steel spans 530 ft. long weighing 5,000,000 lb., resulted from assuming an earth movement with an acceleration of 5 ft. per second per second. These additions to the design

COVERED HIGHWAY BRIDGE WITH ARCADED SIDEWALK

Despite the fact that the old-fashioned covered timber bridge is fast disappearing, a number of these structures are still giving satisfactory service. The illustration shows such a bridge at Rushville, Ind., which has the unusual feature of arcaded sidewalks outside of the supporting trusses.

consisted of pier stiffening, embedding the ends of the steel spans directly in the concrete of the piers to eliminate possible shearing of the anchor bolts at the seats, and general stiffening of the truss bracing. The provisions are not only to provide against the possibility of major earthquakes, but also to resist occasional lesser tremors that seismological records show will be felt occasionally.

Flexible First Story

Two discussions, one based on mathematical analysis, the other resulting from study of actual experiences in previous disasters, tended to prove unsound the theory asserting that buildings may be rendered earthquake resistant by means of flexible lower story construction. Data indicate that the resistance of a building to earthquake shocks depends on rigidity. In addition, from the insurance underwriters' standpoint any type of flexible design is undesirable because of the greater damage to walls and partitions in case of a minor shock. However, these conclusions, based on previous experience, apply to buildings only up to a height of about 100 ft.; for buildings 300 ft. high no definite recommendations were offered.

Assurance was given in the closing paper that the new California building code, which is not yet completed in detail, will contain definite requirements for earthquake-resistant design based on various assumed intensities of shock.

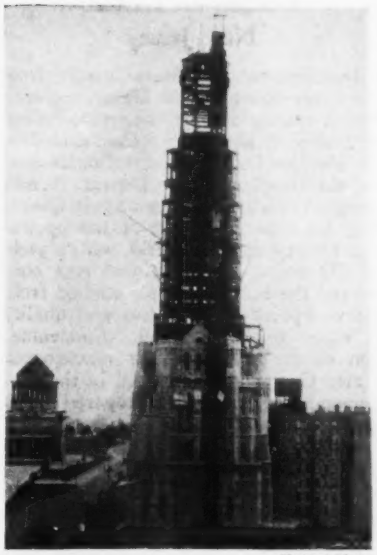
In addition to indicating that engineering science has turned to definite design against earthquakes, the discussions brought out two further points: (1) A serious lack of agreement may be expected when geological opinion is called upon to estimate the probable intensity of earth movement that should be assumed at any given location. (2) Based on data accumulated thus far, rigidity of construction may be considered the best means of producing earthquake resistance.

June Breaks Traffic Records in Holland Tunnel

All traffic records through the Holland tunnel, connecting New York with New Jersey, were broken during June, as in that month, for the first time, more than 1,000,000 vehicles passed through the tube. The total for the month was 1,000,937 vehicles.

An interesting circumstance is that whereas the traffic and gross receipts are mounting steadily, the operating expenses are remaining substantially the same, showing a much greater increase in net income. For the first half of 1929 the total traffic was 4,939,792 vehicles, as against 3,930,090 vehicles for the first half of 1928. The gross receipts were $2,755,293.30, as against $2,185,262 for the first six months of 1928. The operating expenses were $733,072.17 for the first six months of 1929, against $746,012.13 for the first six months of 1928. The net income for the first six months of 1929 was $2,022,221.13, as against $1,439,249.87 for the first six months of 1928.

WORLD'S HIGHEST CHURCH



Herbert Photo.

Steelwork for the tower of the Riverside church in New York City is approaching completion. The edifice, which was to have been finished in April, 1929, was damaged by fire in the falsework Dec. 22, 1928, as reported in *Engineering News-Record*, Dec. 27, 1928, p. 967. The tower will house a carillon of 60 bells, ranging in weight from 10 lb. to 22 tons. The building is said to be the highest in the world devoted exclusively to religious purposes.

Major Sultan to Have Charge of Nicaraguan Canal Survey

Major Daniel I. Sultan of the Corps of Engineers has been designated by Secretary of War Good to be in charge of the survey for the proposed Nicaraguan Canal. The investigation and survey to obtain additional information on the most practical route for a canal was authorized by Congress in its recent session.

First Lieut. Eugene M. Caffey of the 13th Engineers will be assistant to Major Sultan until the arrival of the headquarters of a provisional topographer battalion in Nicaragua to be designated later.

Big Underground Cable-Laying Job Begun in Missouri

A $7,000,000 underground long-distance telephone cable project between Kansas City and St. Louis has been begun. The line will follow the shoulder of U. S. highway No. 40 and is part of a $45,000,000 chain of underground cables to be installed in Missouri, Kansas, Oklahoma, Arkansas and Texas by the Southwestern Bell Telephone Company.

About fourteen months will be required to lay the conduit and construct manholes on the 260-mile route. The new service is expected to be ready for use about Jan. 1, 1931.

Two Buildings Collapse in Montgomery, Ala.

Damage to property estimated at $150,000 was caused by the collapse without warning of the three-story Pizitz department store and an adjacent building in Montgomery, Ala., July 15. No loss of life occurred, due to the fact that the accident happened during the noon hour. Three persons were injured. A 20-ft. excavation adjoined one of the wrecked buildings, but its possible effect upon the accident has not yet been determined.

No Change in Engineers' Lockout

No change is reported in the situation of the New York Board of Transportation or the 288 engineers discharged by it on June 18 after demonstrations over pay increase demands, as reported June 27, p. 1047. Question has been raised as to the legality of the dismissal without notice. The union has engaged Arthur Garfield Hays as counsel, and has also entered protest with the municipal and state civil service commissions against alleged recertification of some of the discharged men to other municipal departments in a lower grade. It is reported that many members of the union blame its organizer, who was not an employee of the Board of Transportation, for misstatements and provocative actions which played a part in precipitating the dismissal.

Milwaukee Opens Municipal Car-Ferry Terminal

On July 9 the city of Milwaukee formally opened the landing facilities and freight yard of the car-ferry terminal which is a part of the new lakefront harbor development. At present there is one slip with its landing apron, but provision is made for duplicating the facilities. The terminal has been leased to the Pere Marquette Railroad, and after the opening ceremonies the railroad's "Car-Ferry No. 22" left with a cargo of cars for Ludington, Mich.

Work Being Rushed on Power Plant at Joseph, Ore.

Material is being ordered as rapidly as possible by the Pacific Power & Light Company, Portland, Ore., for the hydro-electric power plant it is planning to build at Joseph, Ore. The new plant will be erected on the site of an old plant, which was part of the system of the Enterprise Electric Company when that property was acquired by the Pacific company.

The new building will be of brick and will house a 1,500-hp. Pelton wheel direct connected to a 1,250-kva. 2,200-volt generator. Water will be conducted to the plant by a 48-in. wood stave pipe line a little more than a mile in length. It is planned to have the plant ready for operation some time this year.

Springfield Works Opened at Illinois Sewage Meeting

Dedication of the new sewage plant at Springfield, Ill., was a feature of the sixth annual meeting of the Illinois Association of Sanitary Districts, held at Springfield, July 9-10, with eighteen districts represented out of the 22 organized under the law of 1917. The dedicatory address, given by Senator E. B. Searcy, was followed by a description of the plant by W. B. Walraven, chief engineer of the district. This is the third plant formally dedicated under the auspices of the association.

A report on legislation by Clayton J. Barker reviewed the recent changes made by the legislature in the original drainage district law of 1917. Gratification was expressed at the passage of the new water board bill, as the association considers it is becoming an immediate necessity of all communities to treat their domestic and industrial waste so as to prevent stream pollution.

A resolution was passed commending the state Department of Public Health for its action in equipping a mobile field laboratory for the analysis of water and sewage. Besides the more technical matters, there were papers on "Sanitation and Public Health," by Dr. A. Hall, state director of public health; "Sangamon County Conservation," by S. A. Oldfield; and "Conservation and Sanitation of Illinois Streams," by R. H. Brandon, state director of public welfare.

For 1929-30 the officers elected include: president, John Oliver, Highland Park, Ill.; vice-president, Peter Hartz, Aurora, Ill.; secretary, Gustave H. Radebaugh, Urbana, Ill. The next meeting will be held at Aurora and De Kalb, Ill.

Ramapo Watershed Recommended for Eastern New Jersey

Development of a water supply from the upper Ramapo and Mahwah rivers, with a reservoir to be constructed north of Mahwah, has been recommended to the Bergen County Water Commission by the North Jersey District Water Supply Commission after a study of several months. The cost of the project is estimated at $27,700,000, with a yield of 102 m.g.d. This project was considered the best of several studied from the viewpoint of both cost and quality of water to be obtained. Condemnation of the works of the Hackensack Water Company is included in the recommendation, which was prepared under the direction of Arthur H. Pratt, now consulting engineer of the North Jersey District Water Supply Commission.

The preliminary report was made for the purpose of outlining approximate cost and yield of the various possible supplies. The report recommends that more detailed studies be carried on immediately, in view of the expected increase in population to follow the completion of the Hudson River bridge in 1932.

The proposed watershed has an area of 97 square miles situated in Orange and Rockland counties, N. Y. The Mahwah reservoir would be located north of Suffern, N. Y., and would be connected with a point on the Ramapo River above Tuxedo, N. Y., by a diversion tunnel. An aqueduct is proposed to carry the water to a pumping station at New Milford, N. J., whence it would be pumped to various points within the county.

To Ask President to Halt Work on Mississippi Spillways

Meeting in Memphis on July 10, the Mississippi Flood Control Association adopted a resolution to be presented to President Hoover, in which it asked that all work on Mississippi River spillways be halted, while work on the main river defenses be continued. The resolution further requested that new surveys be made of the territory affected and served by the spillways, declaring that these portions of the flood-control program could be reconstructed to furnish maximum protection to territories through which they run.

The association also demanded that amendments to the flood-control act be presented to Congress and that each portion of the act be interpreted. At present, it was declared, Congress interpreted the act one way and the President and the army engineers another.

Sewage-Works Plans Submitted for Part of New Haven, Conn.

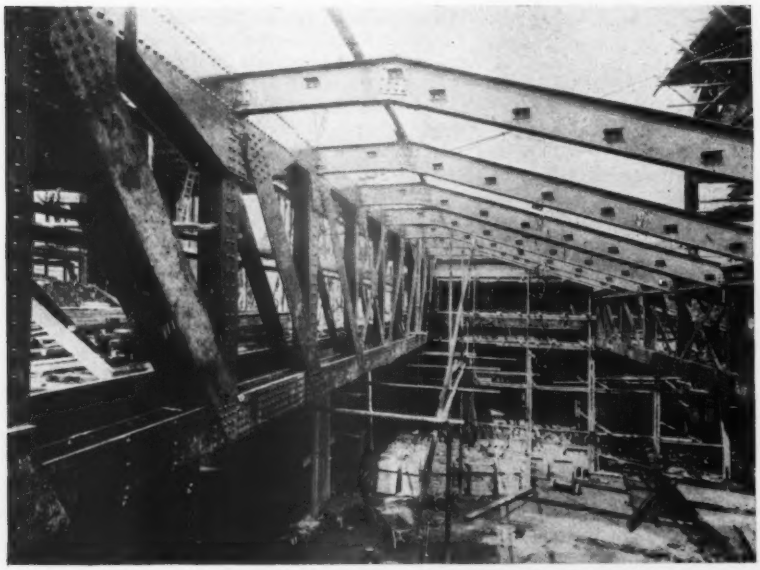
Plans for sewage-works to serve between a third and a half of New Haven, Conn., were submitted to the authorities on June 21 by Fuller & McClintock, New York City, through C. A. Emerson, Jr., of the Philadelphia office. They are based on 1940 estimates of an average dry-weather flow of 11 m.g.d., rising to 17.5 during business hours and taking stormflow to bring the total to 30 m.g.d. Treatment will be by bar screens, grit chambers and settling tanks, with chlorination during the bathing season. Sludge will be pumped to four steel settling tanks, from which, after decantation of the top liquor, the sludge will be barged to sea. The plant will be supported on piles, since the site is under 8 ft. of water at high tide. The estimated cost is $500,000.

Water Resources Branch Opens New Offices

Two new district offices have been set up by the Water Resources Branch, U. S. Geological Survey, one in Hartford, Conn., under Burke L. Bigwood, and the other in Charleston, W. Va., under William Kessler. The Hartford district was made possible by co-operation with the state water commission under a state appropriation of $7,000 per year for two years. Data collected on Connecticut streams will be useful primarily for water supply in the growing municipalities, industrial use, and a little power. The government investigations also will furnish impartial statistics for adjustment of the Connecticut River dispute between Connecticut and Massachusetts.

In West Virginia, steam and hydroelectric power and industrial supply are predominant as a part of the rayon, chemical and other developments which are in progress. Co-operation is with the state public commission and geological survey under state aid of $5,000 per year for two years.

HEAVY STEEL FRAMING FOR ENGLISH THEATER



Stratford-on-Avon, the birthplace of William Shakespeare, is to have a moving picture theater of modern design. This illustration shows a portion of the massive steelwork which will support the gallery. The girder on the left is 12 ft. 9 in. deep and weighs 42 tons. The structure is being erected by Rubery, Owen & Company, of Darlaston, England.

New Bridge Authorized Over Ohio River at Pittsburgh

The War Department has granted Allegheny County, Pa., a permit to build the so-called West End bridge over the Ohio River, which will connect important lanes on the north side of the river with equally important trafficways on the south side.

The bridge will be 1.1 miles long, with 63.36 ft. vertical clearance at the channel piers, and 72.72 ft. vertical clearance for 250 ft. in the center of the stream, thus permitting safe navigation at all river stages. It will cost $3,540,000.

Commission to Study Camden County Sewerage Problems

Recent legislation has resulted in the formation of the Camden County (N. J.) Sewer Survey Commission, organized to make a sanitary survey of Camden County, an area with a population of approximately 200,000, grouped in a number of municipalities. In this area there are already 21 disposal plants discharging into various small streams. The commission intends to investigate and determine the condition of all streams receiving sewage; also the population, type of plant and condition of effluent from each municipality. Recommendations will be made where necessary for the improvement of existing conditions. W. DeWitt Vosbury, of Camden, N. J., is engineer for the commission.

WASHINGTON NOTES

By Paul Wooton
Washington Correspondent

War Department Rules for Navigation at New York and New Orleans—Census Policies

APPLICATION of the New York City Commissioner of Docks for an advancement 100 ft. channelward of the Hudson River pierhead line has been refused by the War Department with the suggestion that if longer piers are needed they can be provided by the excavation of the necessary slips inshore of existing bulkhead lines. After careful investigation, it is stated, the War Department's engineers have come to the conclusion that such a revision of the harbor line would be unfavorable to the interests of navigation.

It is brought out also that excavation inshore would be but returning to navigation areas that have been taken from it by former reclamation work. The position of the shore line of 1767 indicates that practically all the piers south from 47th St. to 17th St. and the buildings along the waterfront stand on made ground, it is stated. Proponents have contended that the presence of rock along the New York shore at a relatively shallow depth would entail enormous expenditures for inshore excavations. This is denied in the report by the army engineers, which states that the —40 rock contour is well landward of the present bulkhead line.

As the result of studies by the new York Harbor Line Board, it has been decided that the width of the fairway should be about 3,000 ft. to permit safe docking of oceangoing steamships without blocking traffic unduly. In answer to the argument that large vessels are handled in some European harbors with a narrower waterway, it is stated that no other port compares with New York in number of railways, density of traffic and extent of tributary hinterland.

New Orleans Bridge Again Disapproved

In confirming the recommendations of the army engineers that the Hero-Hackett bridge project in New Orleans be disapproved the Secretary of War explained that the government's control over structures across navigable streams extends beyond mere regulation of clearances and can be exercised in refusing to grant a permit when it is believed that the construction of a bridge is not feasible from an engineering standpoint. The report of the army engineers discloses, Secretary Good pointed out, that adequate pier foundations cannot be obtained at the proposed location in New Orleans.

After making test borings to the depth of 200 ft. without striking rock, the engineers reported that the building of a bridge at the location proposed would be a difficult feat and is a project which they do not care to indorse. Engineers who have contracted to build the bridge, however, have been represented as saying that there are no reasonable grounds for the objection from the standpoint of pier foundations. Although it was not brought out that the clearances proposed are inadequate, the point was raised, in refusing the application, that a bridge at the site specified would be an impediment to navigation because half of the port facilities lie above it.

Both the Secretary of War and General Jadwin, Chief of Engineers, have pointed out that the way is now open for an application for a bridge site farther upstream where interference with port activities would not be so great. It may not be necessary for the bridge company to apply for a location above all the port facilities, it was stated, if it can be shown that any of the docks and wharves above the site selected are unimportant. The suggestion was made also that a tunnel underneath the river in all probability would meet the official requirements.

Particular attention was directed in the report to recent bridge failures which, it was stated, illustrate the potential menace of large spans to navigation. In this connection, the failure of the Hackensack bridge was mentioned and the difficulties encountered with the Mount Hope bridge were brought out also. In handing down the official refusal for the project, the Secretary said that he is not unmindful of the need of the traffic of New Orleans for ready access to the west side of the river.

Regarding the spiral ramps by which the vehicles would gain the necessary elevation for the proposed bridge, it was brought out that these structures represent a distance of 2 miles. The point was made that a bridge farther upstream could dispense with these ramps, since the land would be cheap enough to allow the usual type of graded approach to be used, so that traffic could travel to the upstream site without being obliged to go any greater distance. In addition to being a potential obstruction to the passage of commerce from the entire valley section through New Orleans, the army engineers' report expresses the opinion that a bridge at the proposed location in New Orleans would restrict that port in its competition with Galveston and Mobile.

Formulate Census Rules

Broad policies that will govern the conduct of the first national census of distribution were formulated at a meeting in Washington July 11 of an advisory committee appointed by Secretary of Commerce Lamont. As the object of the census is to present a complete picture of domestic commerce in the United States, the task faced by the Census Bureau is not simply to produce figures on the volume and value of interindustrial, wholesale and retail trade but to provide comprehensive statistics properly correlated with industrial and merchandising operations. In particular industries and sundry lines of merchandising the collection and tabulation of such statistics require direction by experts familiar with the peculiar conditions that obtain. It will be the function of the advisory committee, and of the subsidiary committees later to be appointed from particular industries and trade, to co-operate with the Census Bureau in establishing the procedure to be followed.

Practically all of the members of the advisory committee on the distribution census are men who have been working with the Department of Commerce for several years on various phases of its program for the elimination of waste in distribution. F. M. Feiker, managing director of the Associated Business Papers, Inc., who will serve as chairman of the committee, was Mr. Hoover's principal lieutenant in 1921-22 in mobilizing the Department of Commerce for the service of the American business man. Dr. Frank M. Surface, assistant director of the U. S. Bureau of Foreign and Domestic Commerce, is a member of the committee. Dr. Surface is the man under which the distribution studies engaged in by the bureau have developed. Dr. Melvin T. Copeland, professor of marketing in the Harvard Graduate School of Business Administration, contributed the chapter on marketing which is presented in the report of Mr. Hoover's committee on recent economic changes. The committee also will have the benefit of the experience of F. A. Gosnell, who until recently was chief statistician in charge of the distribution census.

Engineering Societies

CALENDAR

ANNUAL MEETINGS

AMERICAN ASSOCIATION OF ENGINEERS, Chicago; annual meeting, Mexico City, Aug. 26-28.

AMERICAN WELDING SOCIETY, New York; fall meeting, Cleveland, Ohio, Sept. 9-13.

NEW ENGLAND WATER WORKS ASSOCIATION, Boston; annual convention, Portland, Me., Sept. 16-18.

AMERICAN SOCIETY OF CIVIL ENGINEERS, New York; fall meeting, Boston, Mass., Oct. 9-11.

* * *

THE HIGHWAY RESEARCH BOARD will hold its ninth annual meeting in Washington, D. C., on Dec. 12 and 13, when progress reports will be made on the comprehensive program of highway research now in preparation by the board.

Personal Notes

CHARLES MOTT has been appointed city engineer of Belleville, Ont., succeeding the late Charles D. Campbell.

OTTO N. MUELLER, of Vonnegut, Bohn & Mueller, Indianapolis, has been appointed consulting architect and engineer for state institutions of Indiana.

H. G. OVERHOLT has been appointed by the Portland Cement Association regional structural engineer for the Mid-West district, with headquarters at Chicago.

B. A. EDDY, special assistant to the city engineer of Portland, Ore., has resigned to become engineer of the road department of Los Angeles County, Calif.

HARRY V. KEMMER has been appointed assistant in the engineering schools of Purdue University, to fill the vacancy left by the resignation of E. M. Loebs.

A. C. GODWARD, of Minneapolis, Minn., has been appointed to the Minneapolis Charter Commission, taking the place left vacant by the death of John N. Berg.

DAVID M. OLTARSH, consulting engineer, of New York, will give a radio talk on July 27 at 4:45 p.m. on "Romance of Engineering" over WEAF and associated stations.

M. ZAKI, hydraulic engineer of Cairo, Egypt, recently addressed the Denver Chamber of Commerce on the subject of ancient methods of irrigation in Egypt as contrasted with methods in present use.

C. S. HAMMATT, of Jacksonville, Fla., has been reappointed by the Governor as a member of the state board of engineering examiners. Mr. Hammatt is the only member to hold membership continuously since the creation of the board in 1917. He is a past-president of the Florida Engineering Society.

H. S. MORELAND, of Hot Springs, Ark., has succeeded Cleveland Smith as city engineer.

H. O. WAGNER, a civil engineer with the Colorado State Highway Department, has won the $25 prize for the best paper on "What Engineering Has Done for Colorado," offered by the Colorado Engineering Society.

W. H. NICHOL, junior highway engineer in the U. S. Bureau of Roads, has been transferred from Washington to Denver. He has just completed an eighteen months' course of study in the division of management.

HAROLD P. RADIGAN, for the past seven years in the bridge office of the Vermont Highway Department at Montpelier, has resigned to accept a position with the Kittredge Bridge Company, of Concord, N. H.

GEORGE HENRY has been named village engineer and superintendent of Le Roy, N. Y., to succeed Ray S. Palmer, resigned. Mr. Henry, who has been assistant to Mr. Palmer for the past six years, will also have charge of the municipal water system.

F. E. CUDWORTH has resigned as resident engineer, New Jersey Section, Hudson River Bridge, Port of New York Authority, to become chief engineer for the Heyman & Goodman Company, of New York City.

JOHN A. ELLIOTT, senior highway engineer in the United States Bureau of Roads, Portland, Ore., has recently had the degree of Civil Engineer conferred upon him by the University of Washington. Mr. Elliott has been connected with the Portland bureau for twelve years.

Miss MAE A. SCHNURR, for the last five years secretary to Elwood Mead, Commissioner of Reclamation, has been appointed to fill the new post of assistant to the Commissioner. Miss Schnurr is also secretary of the International Water Commission, which will negotiate with Mexico the treaty concerning water rights on the Rio Grande and the Colorado and Tia Juana rivers.

ERWIN AEGERTER, deputy building commissioner of St. Louis, Mo., for the past six years, has been appointed building commissioner to succeed Edward E. Christopher. FRANK A. HUESER, an architect for the Board of Public Service, was promoted to Mr. Aegerter's old position.

J. E. JELLICK, concrete engineer, who for the last three years has been manager of the Pacific Coast offices of the Portland Cement Association, has joined the executive staff of the Calaveras Cement Company, of San Francisco, as manager of advertising and promotion. As regional manager for the Portland Cement Association, Mr. Jellick directed the activities of the five district offices in the states of Arizona, California, Oregon and Washington and in British Columbia. He was formerly connected with the Wyoming State Highway Department and the Los Angeles County Road Department.

ARTHUR D. LITTLE, president of Arthur D. Little, Inc., of Cambridge, Mass., delivered his presidential address before the Society of Chemical Industry (London) at Manchester, England, July 9. His subject was "Science and Labor." During his stay in England, Mr. Little will receive the honorary degree of Doctor of Science from the University of Manchester and honorary associateship in the Manchester College of Technology. He will return to the United States late in August.

Obituary

HENRY W. REED, of Mishawaka, Ind., founder of the H. W. Reed & Sons Construction Company, died recently after an illness of six months. He was born at Youngstown, Ohio, 83 years ago and had been in the contracting business for many years.

JOHN J. O'CONNELL, hydraulic engineer connected with the Brazilian subsidiary of the Electric Bond & Share Company, was stricken while participating in the Fourth of July festivities in Sao Paulo, Brazil, and died on July 5 at Rio de Janeiro.

W. L. BRECKENRIDGE, formerly chief engineer of the Chicago, Burlington & Quincy Railroad, died at his home in Chicago on July 11. He was 72 years old and retired from active life about six years ago on account of ill health. Mr. Breckenridge was born at Louisville, Ky., in June, 1857, and practically all his engineering career was with the Chicago, Burlington & Quincy Railroad, beginning as a rodman in 1879 and becoming chief engineer in 1899. He was a member of the American Society of Civil Engineers, the American Railway Engineering Association and the Western Society of Engineers.

WALTER L. GOODWIN, chief maintenance engineer of the Washington State Highway Department, died in Seattle June 1, following an illness of several months. Early in his career Mr. Goodwin went to Alaska as locating engineer on the White Pass & Yukon Railroad and later served in the same capacity on the Copper River & Northwestern Railroad. Later he became associated with the Alaska Road Commission and for seven years was superintendent of the Nome district. He returned to the States just before the World War, and after America entered the conflict he was assigned as chief engineer of the work of building railroads and storage depots at Columbus, Ohio. Later he served as locating engineer on the Mulholland Highway in southern California.

Construction Equipment and Materials

Concrete Pavement Yardage

There is given below a tabulation of concrete pavement yardage awarded during the month of June, 1929, and also the total number of square yards awarded for roads, streets and alleys in the United States for the year 1929 to date as of June 30:

	Sq. Yd. Awarded During June, 1929	Sq. Yd. Awarded From Jan. 1, 1929, to June 30, 1929
Roads	10,410,246	50,846,714
Streets	5,466,896	20,999,510
Alleys	544,305	1,635,858
Totals	16,421,447	73,482,082

New Alloy Steel to Be Used in Chrysler Building

Ornamental metal work on the exterior of the new 808-ft. Chrysler Building in New York City is to be of nirosta steel, a new alloy produced by the Ludlum Steel Company, Watervliet, N. Y., under patent rights obtained from the Krupp works of Essen, Germany. It is claimed that the new metal has a tensile strength considerably in excess of other steels and that it has a finish resembling platinum which will preserve its luster on exposure to gas, smoke and other atmospheric conditions.

Standardization Furthered by Recent Agreement

Ratification July 9 of a co-operative agreement between the American Standards Association and the U. S. Bureau of Standards has been announced. Under the terms of the agreement, the primary effort of the Bureau of Standards will be to help those groups having no satisfactory standardization facilities of their own to formulate temporary standards designed to meet immediate requirements. These will be known as "Commercial Standards." The American Standards Association will work with groups having standardization facilities in the formulation of "American Standards," representing a true national consensus of approval. Where feasible, temporary standards prepared with the aid of the Bureau of Standards will be brought before the American Standards Association for advancement to the rank of "American Standards."

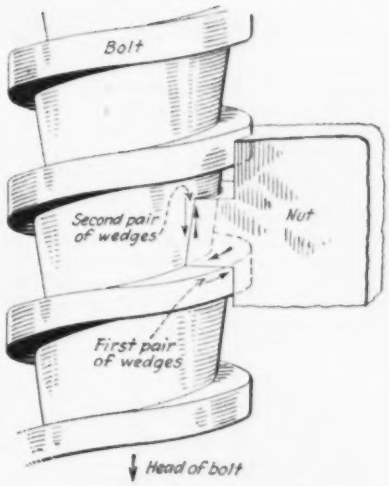
The board of directors of the American Standards Association has received an invitation to join with the standardization bodies of fourteen European countries in the International Standards Association at Baden, Switzerland. Acceptance of the invitation has been deferred to permit further study.

New Developments

Self-Gripping Thread Utilizes New Principle

Many advantages are claimed for a new thread-lock invented by Hugues Louis Dardelet, a Frenchman, which is now being introduced into this country. By this device, without the use of any auxiliary mechanism, a nut can be locked upon any portion of the threaded length of a bolt, can be tightened or loosened without injury to the thread, and can therefore be re-used an indefinite number of times. No special tools are required, the ordinary wrench being sufficient.

The principle upon which the device acts is shown in the accompanying diagrammatic sketch. The thread itself resembles the Acme standard square thread, but at the bottom of the groove on the bolt, and at the point of the thread in the nut, there are introduced slight tapers at a 5 deg. angle. These are the locking surfaces. As the distance between threads is somewhat greater than the width of the threads themselves, there is a slight endwise play. When the nut is tightened, the locking surfaces are forced more tightly together, which causes the thread to lock itself automatically with a force proportional to the tension on the bolt. Since the locking principle lies within the profile of the thread, the lock operates at any point upon the threaded length of the bolt, wherever tightening is discontinued.



NUT LOCKS BY WEDGING

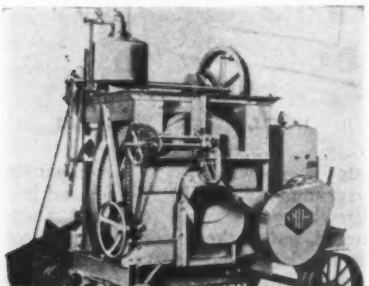
This thread lock has been in use in Europe for several years. It is now being introduced in America by the Dardelet Threadlock Corporation, 120 Broadway, New York City, and is in production by the Bethlehem Steel Company and the Federal Screw Company.

LAYING A WELDED PIPE LINE IN THE SOUTHWEST

Carefully trained crews organized as in factory production are being employed in the construction of an electrically welded pipe line from Jal, N. M., to El Paso, Tex., through a desert country. The line is being built entirely by welding, employing the metallic arc. In construction, 30-ft. lengths of pipe are tack-welded into sections of from five to eight lengths. All joints are then simultaneously welded, the section being turned by tongs, as shown in the left illustration. General Electric and Lincoln welders are used in this process. After the sections are completed, they are joined by the bell-hole method, in which a hole is dug for the welder and he works completely around the pipe as it rests in the ditch. For this part of the work the Fuzon welder, shown in the right illustration, is used. This is a mobile outfit, mounted on standard wheels with pneumatic tires, which can be moved at automobile speeds. The pipe itself was also fabricated by the welding method.

14-S Mixer With Large Openings

A new 14-S non-tilting mixer said to be simple in construction and fast in operation has recently been introduced by the T. L. Smith Company, of Milwaukee, Wis. The drum is large in diameter and narrow, equipped with ten deep full-width discharge buckets and large drum openings. It is claimed that these drum improvements permit the use of a wider throated skip and wider discharge chute, both time-saving features that assure quicker loading and faster discharge. Complete front end operation is provided, with both charge



NON-TILTING CONCRETE MIXER

and discharge sides of the mixer visible. The drum rollers are equipped with oversize Timken bearings in dust-tight housings.

Other features include pressed steel drum heads, short swinging discharge spout and auxiliary stationary spout, band friction hoist clutch and brake, forged steel rear axle brackets and wheels that turn under the frame for easy handling.

New Publications

Steel Construction—AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC., New York City, has initiated a technical data bulletin service for the benefit of its members. These bulletins, which will be issued from time to time in loose-leaf form, will contain the results of engineering research and outline the best methods of steel construction. The first bulletin, just published, treats of the effects of temperature on structural steel.

Tractors—FOOTE BROS. GEAR & MACHINE COMPANY, Chicago, Ill., has published a new catalog B-100 describing all three models of the Bates Steel Mule, which is made in 28-, 40-, and 95-hp. sizes.

Waterproofing—THE WATERPROOFING COMPANY, 345 East 33d St., New York City, has issued an unusually attractive 26-p. illustrated booklet describing Cow Bay waterproof cement, which is not usually offered for sale commercially but is applied by the company itself in the form of a coating upon the inner surface of foundation walls, floors, swimming pools and similar installations. When preferable, as in floors, the material may be laid as a monolithic slab rather than as a coating. The system employs neither paper nor cloth, but depends entirely upon the properties of the cement and the method of installation. One page of the booklet is devoted to a description of the waterproofing of the Pennsylvania Railroad tunnels under the East River in New York City. The booklet is unusually well illustrated by artistic reproductions of photographs and architects' drawings showing well-known buildings in which the process has been used.

Steel Poles—TRUSCON STEEL COMPANY, Youngstown, Ohio, has issued a new catalog 1305 describing Weltrus and Weltube copper alloy steel poles and H-frames, together with accessories. The catalog includes a large amount of eugineering tables and detailed drawings dealing with pole construction, including various types of footings.

Portland Cement—ATLAS PORTLAND CEMENT COMPANY, New York City, has issued an 8-p. booklet "The Manufacture of Portland Cement," written by Edward B. Boyer, manager of its technical department, which gives a history of portland cement and a thorough description of modern methods of manufacture.

Underpinnings—SPENCER, WHITE & PRENTIS, New York City, in a 24-p. illustrated booklet describe the methods and apparatus used in the Pretest method of underpinning buildings.

Sand and Gravel Equipment—SMITH ENGINEERING WORKS, Milwaukee, Wis., has issued two bulletins descriptive of Telsmith equipment for sand and gravel production. One of these is devoted entirely to jaw crushers, while the other covers gravel and sand washers.

Costs and Contracts

E. N.-R. Index Numbers

Cost		Volume		
July 1, 1929	**204.77**	**June, 1929**	**347**
June 1, 1929	205.65	May, 1929	395
July 1, 1928	206.65	June, 1928	308
Average, 1928	206.78	Average, 1928	287
Average, 1927	206.24	Average, 1927	263
1913.....	100.00	1913.....	100

This Week's Contracts

Heavy construction contracts, reported by *Engineering News-Record* in the week of July 18, with some comparisons, total as follows:

(In Thousands of Dollars)

	July 18, 1929	July 11, 1929	July 19, 1928
Building:			
Industrial.....	$4,788	$12,794	$8,193
Commercial.....	38,053	23,831	32,333
Streets and roads ..	15,909	17,166	17,128
Other eng. constr...	22,743	14,301	9,030
Total.....	$81,493	$68,092	$66,684
Total, all classes, Jan. 1 to July 18:			
1929.....			$2,467,018
1928.....			1,976,274

Business Notes

NEWHALL CHAIN FORGE & IRON COMPANY, New York City, has completed negotiations for the purchase of the Rensselaer Chain Works at Rensselaer, N. Y., together with adjoining properties to permit of extensions.

YEOMANS BROTHERS COMPANY, Chicago, Ill., has appointed the Ryan Sales Company, Nashville, Tenn., its representative in that portion of the state east of the Tennessee River.

AMERICAN HOIST & DERRICK COMPANY, St. Paul, Minn., has opened a branch office and warehouse in Los Angeles, Calif. This will be in charge of W. H. Lummus. Announcement is also made of the addition of W. M. Cusac, formerly with the McMyler Interstate Company, to the company's Chicago sales force.

UNION CHAIN & MANUFACTURING COMPANY, Sandusky, Ohio, has opened new offices at St. Louis, Mo., under the management of Hugh Scott, and at Indianapolis, Ind., in charge of A. R. Young.

WHEELING STRUCTURAL STEEL COMPANY, Wheeling, W. Va., is the outgrowth of a merger of the J. E. Moss Iron Works and the Riverside Bridge Company. The new company is operating two plants, one at Martins Ferry, Ohio, and the other at Wheeling, W. Va., with a combined output of 25,000 tons a year. R. B. Smith is president and Alexander Best is secretary-treasurer.

RAMP BUILDING CORPORATION, New York City, has elected Fred W. Moe president. Mr. Moe is a former vice-president and has been for years in charge of the company's field activities.

AMERICAN FORK & HOE COMPANY, Cleveland, Ohio, has appointed Clarence E. Irwin St. Louis representative of its railway appliances division.

COPPERWELD STEEL COMPANY, Glassport, Pa., has established a northeastern district, including all of New England and New York State north of Westchester and Rockland counties, under the management of George F. Bain, with headquarters at 30 Church St., New York City. Paul Van Wagner is now district manager for New York City, New Jersey, Pennsylvania and West Virginia, with offices at the same address.

TIMKEN ROLLER BEARING SERVICE & SALES COMPANY, Canton, Ohio, announces the promotion of R. C. Brower from general manager to the posts of assistant secretary and assistant treasurer of the Timken Roller Bearing Company. He will be succeeded by W. H. Richardson, formerly manager of the New York branch. Transfers of other branch managers are: E. H. Austin, Kansas City to New York; L. J. Halderman, Atlanta to Kansas City; Parker T. Ancarrow, Richmond to Atlanta. Stewart B. Ancarrow is appointed manager at Richmond.

CONSTRUCTION NEWS

Some of the Week's Large Projects

AMONG the announcements for the current week are the following:

Proposed Work

Hospital, Pittsburgh, J. L. Stuart, consult. engr., will award separate contracts, $6,000,000. This corrects report in June 27 issue.

Hotel, etc., Chicago, Ill., J. R. Thompson Co., sketches, $4,500,000.

Hotel, etc., Long Branch, N. J., W. H. Pawson, New York, $3,000,000.

Waterworks, Seattle, Wash., $2,750,000.

Factory, St. Louis, Mo., Gardner Motor Co., and Parks Aircraft Mfg. Co., East St. Louis, Ill., expending, $2,500,000.

Exchange, New York, N. Y., New York Telephone Co., soon takes bids, $2,115,000.

Grain elevator, Kingston, Ont., Canada Steamship Lines, bids in August, $2,000,000.

Bank, etc., San Francisco, Calif., Income Properties Corp., sketches, $2,000,000.

Apartment, etc., New York, N. Y., Colford Holding Corp., $1,700,000.

Hotel, Sioux City, Ia., Blackstone Realty Co., $1,500,000.

Hospital, Phila., Pa., Women's Hospital of Philadelphia, $1,500,000.

Plant, Phila., Pa., I. Fischman & Son, $1,500,000.

Warehouse, etc., Detroit, Mich., Michigan Bell Telephone Co., $1,500,000.

Hotel, Sioux City, Ia., Eppley Hotel Co., Omaha, Neb., $1,350,000.

Administration, Wellesley, Mass., Wellesley College, revised plans, $1,250,000.

Apartment, New York, N. Y., Forty Seven East 88th Street Corp., $1,110,000.

Office, Long Island City, N. Y., New York and Queens Light & Power Co., $1,075,000.

Loft, New York, N. Y., Varick Holding Corp., $1,000,000.

Cathedral, Windsor, Ont., St. Clair Anglican Diocese, $1,000,000.

Memorial, Wash., D. C., Roosevelt Memorial Assn., New York, $1,000,000.

Stadium, Jersey City, N. J., Bd. City Comrs., sketches, $1,000,000.

Laboratory, New York, N. Y., Montefiore Hospital, $1,000,000.

Railways, Missouri, Missouri, Kansas & Texas R.R., St. Louis, Mo., $1,000,000.

Apartment, Oklahoma City, Okla., N. E. Bowden, $1,000,000.

Warehouse, etc., Jersey City, N. J., Pennsylvania R.R., Phila., Pa., sketches, $1,000,000.

Apartment hotel, Atlantic City, N. J., Syndicate, c/o J. Friedberg, $1,000,000.

Bids Asked

Bank and office, Ft. Wayne, Ind., Lincoln Natl. Bank & Trust Co., taking bids, $5,000,000.

Court house, Brooklyn, N. Y., J. J. Byrne, pres., Brooklyn Boro, bids about Sept. 1, $4,000,000.

Bridge, Toledo, O., bids about Aug. 1, $3,000,000.

Office and bank, Toledo, O., July 28, by Mills, Rhines, Bellman & Nordhoff, for Ohio Savings Bank Co., $3,000,000; steel to American Bridge Co., Toledo.

Exchange, New York, N. Y., New York Telephone Co., bids about Aug. 1, general contract, $2,000,000.

Apartment, etc., New York, N. Y., Grand View Construction Co., bids about Aug. 20, $1,000,000.

Turbine, etc., Centralia, Wash., Aug. 13, by City Council, $1,000,000.

Bids Received

Subway, Brooklyn, N. Y., Bd. Transportation, New York, from Del Baso Constr. Co., Mt. Vernon, $4,600,000.

Public Bond Elections, coming and decided, are listed on Construction News page 31.

Spillway, New Orleans, La., U. S. Engineer Office, from Stevens Bros., St. Paul, Minn., and Miller & Hutchins, Ocean Springs, Miss., $3,065,957.

Court house, Media, Pa., Comrs. Delaware Co., general contract from Nelson-Pedley Co., Phila., and others totalling $1,518,577.

Contracts Awarded

Airport, Secaucus, N. J., New York Air Terminal, Inc., New York, sub-contract to McGraw Constr. Co., Peekskill, N. Y., est. $8,000,000.

Apartment, New York, N. Y., Lendex Terrace Corp., to Henry Mandel Building Co., New York, est., $6,000,000.

Railway, Indiana, Cleveland, Cincinnati, Chicago & St. Louis Ry. Co., tracking and bridges, Cincinnati, O., to Walsh Constr. Co., Davenport, Ia., $5,000,000.

Law, New Haven, Conn., Bd. Trustees, Yale University, to Sperry Treat, New Haven, est., $3,000,000.

Bridge, Pittsburgh, Pa., Comrs. Allegheny Co., sub-structure to Dravo Contg. Co., Neville Island, Pittsburgh, $1,780,150.

Printing plant, Menands (mail Albany), N. Y., J. B. Lyons Publishing Co., Albany, to Turner Constr. Co., New York, est. $1,250,000.

Nurses home, Pittsburgh, Pa., Schmidt, Garden & Erickson, archts., structural steel, to John L. Mullen Contr. Co., Pittsburgh, for St. Francis Sisters, total est., $1,250,000.

Hospital, Cleveland, O., City, to C. Shutrump & Son Co., Cleveland, $1,152,140.

Hotel, Shreveport, La., Reynolds Hotel Co. to Ashton Glassell, Shreveport, est., $1,000,000.

Exchange, New York, N. Y., New York Telephone Co., to Turner Constr. Co., New York, est., $1,000,000.

Newspaper plant, etc., Brooklyn, N. Y., Brooklyn Daily Eagle, to W. Kennedy Co., Brooklyn, est., $1,000,000.

Department, New Haven, Conn., Yale University, to G. A. Fuller, New York, $1,000,000.

Construction News of the Week

Waterworks

Proposed Work

Calif., Redwood City—San Mateo Co. Water Dist. to be organized to finance water works to serve towns and cities in San Mateo Co., source of supply to be Hetch Hetchy lines of City and San Francisco Co. $4,000,000-$5,000,000.

Calif., Riverside—Property Owners Romoland Dist. election $690,000, constructing waterworks, wells, distributing system, pumping plants.

Conn., Putnam — Water pipe system, incl. 1 m.g. tank. $75,000. Symonds & Stevens, 70 State St., Boston, Mass., engrs.

Ill., Joliet—Mains in John and May Sts., York, Mason and Cowler Aves. $24,413. A. S. Calkins, City Hall, engr.

Kan., Ft. Scott—Filtration plant. $100,000. F. Hawthorne, city engr.

Mont., Great Falls—Improving waterworks, 4 m.g. storage reservoir, extending filtration plant, mains, pumps, for fire protection. $750,000-$1,000,000 bond issue authorized. W. H. Harrison, city clk.

N. J., Prospect Park (mail Paterson)—Bd. Boro Council, Municipal Bldg., water supply tank in upper section, also pumping station. $15,000. S. E. Greydomes, 121 Ellison St., Paterson, boro engr.

N. J., Totowa (mail Paterson) — Bd. Boro Council, Boro Hall, preliminary plans mains in Mitchell Ave. $15,000. W. Ferguson, 152 Market St., Paterson, boro engr.

O., Findlay—Bd. Control bids early in fall, developing water supply, distribution program, incl. pumping station, filtration plant, water softener.

Okla., Maud—J. Ingle, city clk., rejected bids July 3, 2 drilled wells, 20,500 ft., 4- to 8-in. main extensions. $56,000. Noted June 27.

Pa., Pittsburgh—Soon takes bids altering Howard Pumping Station, North Side. $35,000. C. M. Reppert, City-County Bldg., engr.

Tex., Sweetwater—City, c/o C. W. Bryant, mayor, and S. Bothwell, mgr., soon takes bids filtration plant, $40,000. Hawley & Freese, 411 Capps Bldg., Ft. Worth, and H. N. Roberts, Lubbock, engrs. Noted May 2.

Wash., Seattle—W. D. Barkhuff, city engr., applied for permit to divert industrial water supply from White River, 20 mi. pipe will be needed. $2,750,000.

Ont., Harrow — Waterworks, incl. standpipe, 4, 6 and 8 in. mains, hydrants, electric pumping plant. $56,000. A. W. Connor, Town Hall, Riverside, engr. Noted June 27.

Que., Quebec City—Filtration plant. $1,000,000.

Bids Asked

Ark., Holly Grove — July 22, by Comrs. Water Works Impvt. Dist. 1, 11,455 ft. 6 and 8 in. c.i. pipe, 6,700 ft. 2 in. wrought iron galvanized pipe, 33 fire hydrants, valves, and specials and 100,000 gal. tank on 110 ft. tower. Lund Eng. Co., Home Insurance Bldg., Little Rock, engr. Noted May 23.

THESE reports are grouped under each class (water-works, sewers, etc.) and under each stage of the work (proposed, bids asked, etc.) according to the alphabetical order of states.

Where name of official is not given inquiries should be addressed to City Clerk, County Clerk, or corresponding official.

Md., Baltimore — July 23, by Bd. Awards, 3,615 lin.ft. 6- to 16-in. mains in North Point Rd. E. G. Rost, Municipal Office Bldg., engr.

Md., Baltimore—July 23, by Bd. Awards, 760 ft. 48 in. watermains and 19 tons 48 in. c.i. fittings in Druid Hill Park. E. G. Rost, Municipal Office Bldg., engr.

Mass., Boston—July 23, by Dpt. P. Wks., waterworks, in West Roxbury; and July 20, in Boston Proper. $15,000. J. H. Sullivan, comr.

Mich., Detroit—July 31, by Bd. Water Comrs., Water Bd. Bldg., water check valves for motor driven pumping units for high and low lift plants and boster station, Springwells Station Contr. PC-49; condensing equipment for 5,000 kw. steam turbines, Power Plant, Springwells Station, Contr. PC-47. G. H. Fenkell, genl. mgr. and ch. engr.; adv. E. N.-R. July 18.

Mich., Royal Oak—July 22, by R. B. Fleming, city clk., fifty 6 in. fire hydrants, 50 fire hydrant gates, 40 D.W.S. 6 in. gates, twelve 8 in. gates, twelve 4 in. gates, 75 valve boxes 5 ft. 5 in. x 6 ft. 6 in., 75 water gate manhole frames. E. M. Shafter, city engr.

Minn., Walker—July 29, by R. A. Oliver, village clk., improving waterworks, 80,000 gal. reservoir, rein.-con., steel or wood mains.

N. Y., Buffalo—Aug. 15, by Dpt. P. Wks., G. Fisk, comr., Municipal Bldg., 300 ft. 72 in. steel or c.i. conduit, incl. valves, vaults, concrete bulkheads, pile driving, etc., at Buffalo Filtration Plant; adv. E. N.-R. July 18.

N. Y., Long Island City—July 23, by J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., New York, mains in 43rd Ave., 47th Rd., 1st Ward; 58th Lane, 48th, 69th Aves., Stockholm, Ingar, 59th, 82nd, 83rd, 85th, 101st Sts., 2nd Ward; Cambria, Hillside, 44th Aves., 126th, 150th, 196th Sts., 3rd Ward.

N. Y., New York—July 23, by J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., mains in Bronx Zoological Park, Bronx Boro.

S. D., Castlewood—Aug. 9, by City, 11,000 ft. c.i. mains, 19 hydrants, 1 open well, pump, steel or wooden tank. $20,000. W. E. Buell & Co., 337 Insurance Exch., Sioux City, Ia., engrs.

S. D., Mitchell — July 24, by City, 2 m.g. filtration and purification plant, 16 in. c.i. force main. $125,000. J. C. Skallin, city engr. Noted May 16.

Tex., Fort Worth—Tarrent Co. Water Control & Impvt. Dist., c/o W. R. Bennett, pres., bids about Sept. 1, 2 reservoirs, $6,500,000. Hawley & Freese, 411 Capps Bldg., engrs.

See proposal advertising on page 130

Constr. News page 27

LEADITE

Trade Mark Registered U.S. Pat. Office

Offices of the Philadelphia Suburban Water Company, Bryn Mawr, Penna.

Philadelphia Suburban Water Company —*uses* LEADITE *exclusively*

This well-known Water Company, one of the C. H. Geist properties, supplies a population of about 315,000 persons through approximately 900 miles of water mains.

It is a significant fact that they have USED LEADITE EXCLUSIVELY on approximately 230 miles of their water mains laid in the last 4½ years, (sizes up to 24 in. inclusive, and pressures averaging 60 lbs. per sq. in.—with maximum considerably above that figure). In fact, even prior to 1925, this Company used LEADITE extensively.

The daily per capita consumption of water is slightly under 60 gallons, which includes Domestic, Commercial and Industrial users—also fire, flushing and municipal purposes. This figure also includes all losses by leakage. These figures are excellent proof of tightness of pipe lines.

Mr. Carleton E. Davis* is Manager of the Philadelphia Suburban Water Company.

*Mr. Davis is a Past President of both the American Water Works Association and the New England Water Works Association—also former Chief Engineer of Philadelphia Bureau of Water for 11 years.

The pioneer self-caulking material for c. i. pipe.
Tested and used for over 30 years.
"Saves at least 75%."

THE LEADITE COMPANY
Land Title Building - - Philadelphia, Pa.

No Caulking

Waterworks (Continued)

Tex., Naples—July 25, by City, c/o Secretary, waterworks, incl. 50,000 gal. steel elevated tank ,and 65,000 gal. concrete underground reservoir, c.i. mains, laterals. F. E. Hess, Allen Bldg., Dallas, engr. Noted May 16.

Contracts Awarded

Ky., Providence—Filtration plant, settling basin, to J. F. Malcome Co., Kansas City, Mo., $68,000. Noted June 13.

Md., Baltimore—Mayor and City Council, station equipment for Vernon Pumping Station, to Dravo-Doyle Co., Schaff Bldg., Phila., Pa., $129,890. Noted June 27.

Mich., Detroit—Fire Dpt., one thousand 6 in. double nozzle fire hydrants f.o.b. Detroit, also one thousand 6 in. double disc standard hub end gate valves, to Michigan Valve & Fdry. Co., Clayton and Parkinson Sts., $65,450 and $17,400 respectively; 6 in. Class "B" c.i. pipe in 12 ft. lengths, to R. D. Wood & Co., 400 Chestnut St., Phila., Pa., $39.84 per net ton.

Minn., New Ulm—City, 1 story, 62 x 76 ft., brick filtration plant, water softener, feeders and compressors, to Woodrich Constr. Co., 808 Metropolitan Life Bldg., Minneapolis, $124,350. Noted Apr. 18.

N. Y., Brooklyn—Bd. Water Supply, Municipal Bldg., New York, connecting conduits between City Tunnels 1 and 2, Sterling Pl. and Waverly Ave., to J. P. Welsh Eng. Co., 33 Continental Ave., Forest Hills, $366,490. Noted June 13.

N. Y., New York—J. J. Dietz, comr. Water Supply, Gas & Electricity, Municipal Bldg., chlorinating machines at Hillview Reservoir, Yonkers, to Wallace & Tiernan Co., Belleville, N. J., $17,870. Noted June 20.

N. D., Belfield—For 9,217 ft. 6 and 8 in. c.i. pipe, 16 hydrants, 12 gate valves, 8,744 lb. special castings, 50,000 gal. steel tank on 136 ft. steel tower, to Haggart Constr. Co., 214 Roberts St., Fargo, $33,611. Noted June 13.

Wash., Seattle—Bd. P. Wks., steel portion new pipe line to serve Cedar Falls Power Plant, to Seattle Boiler Wks., 1132 West 45th St., $120,000. Noted May 16.

Wis., Milwaukee — Dpt. P. Wks., R. E. Stoelting, comr., 2,398 ft. 16, 24 and 30 in. c.i. mains in Muskego Ave., to Wenzel & Henoch Co., 5025 State St., $41,962. Noted July 4.

Sewers

Proposed Work

Fla., Miami—City Comn. sanitary sewerage system in Shenandoah and Bryan Park Dist. $300,000 available.

Ill., Joliet—Sewers in Clinton, Mason and Cowler Sts. $25,229. A. S. Calkins, City Hall, engr.

Mich., Grosse Pointe—Fox Creek Closed Drain and Combined Sewer Interceptor from Cadieux to Fisher Rds., 5,000 ft. 11½ ft. combined sewer interceptor with 5 centered arch section, and 5,000 ft. 12- to 81-in. concrete combined sewer. Mason L. Brown & Son, Capitol Theatre Bldg., Detroit, engrs.

N. J., Cedargrove — Twp. Com., Township Hall, sewage disposal plant on Little Falls Rd. $100,000. T. F. Bowe, 110 William St., New York, engr.

N. J., Clifton—Bd. City Council, City Hall, preliminary plans sanitary sewers in Gould St., Hawthorne and Paulisen Aves. $25,000. J. L. Fitzgerald, city engr.

N. J., Fort Lee—Bd. City Comrs., Municipal Bldg., preliminary plans sanitary sewer in Virginia and McElroy Aves. $25,000. McClave & McClave, 600 Gorge Rd., Cliffside Park, engrs.

N. J., Hackensack—Hackensack Impvt. Comn., Municipal Bldg., preliminary plans sanitary sewerage system on South St. and Jersey Pl. $25,000. F. Campbell, city engr.

Okla., Chickasha—Preliminary plans storm sewerage system in business section. $50,000. R. C. Bradley, Chickasha, engr. Noted July 4.

Okla., Leedy — Preliminary plans sanitary sewerage system. $30,000. Engineer not selected.

R. I., Providence—City, P. Wks. Dpt., sewage disposal plant, Fields Point Sect. Est. exceeds $25,000. T. J. H. Pierce, City Hall, engr. Noted Oct. 4.

Tex., Sweetwater—City, c/o C. W. Bryant, mayor, and S. Bothwell, mgr., soon takes bids sewage disposal plant. $150,000. Hawley & Freese, 411 Capps Bldg., Ft. Worth, and H. N. Roberts, Lubbock, engrs.

Ont., Cobourg—Town Council sewerage system. $60,000.

Bids Asked

Ark., Holly Grove—July 22, by Comrs. Sewer Impvt. Dist. 1, R. Abramson, secy., 4 mi. 6- to 12-in. sanitary sewers, sewage disposal plant, sedimentation tank, sludge drying bed, etc. Lund Eng. Co., Home Insurance Bldg., Little Rock, engr.

Ga., Monticello—See "Streets and Roads."

Ill., Hinsdale—July 29, by Comrs. Hinsdale Sanitary Dist., 7.75 mi. 12- to 42-in. intercepting sewers, complete disposal plant, incl. Imhoff tank, sprinkling filters. Pearse, Greeley & Hansen, 6 North Michigan Ave., Chicago, engrs. Noted July 4.

Ill., Kewanee — Aug. 2, by Bd. Comrs. Kewanee Park Dist., storm sewers in Baker Park, Sects. 1, 2 and 3. A. Cook, pres.; adv. E. N.-R. July 18. Noted June 20.

Ia., Mason City—July 23, by City, 3,283 ft. 12- to 12-in. vitr. clay sewers in Dist. 2; 1,398 ft. 12- to 18-in. in Dist. 3; 5,509 ft. 12- to 30-in. vitr. clay DS tile, concrete or segmental block sewers in Dist. 4; 26,667 ft. 12- to 48-in. in Dist. 5; 9,166 ft. 8 in. vitr. clay sewers in various streets. C. H. Stevens, city engr. Noted Mar. 21.

Kan., Olathe—July 22, by N. McCulley, city clk., complete sewage disposal plant, auxiliary equipment. $40,000. E. T. Archer & Co., 609 New England Bldg., Kansas City, Mo., engrs. Noted Jan. 24.

Md., Baltimore — July 23, by Bd. Awards, manhole frames, covers, sewer inlet and similar c.i. castings to Bureau of Sewers. M. J. Ruark, Municipal Office Bldg., engr.

Mass., Boston—July 29, by Dpt. P. Wks., sewerage system in Brighton and West Roxbury, $25,000. J. H. Sullivan, comr.

Mich., Clio—July 26, by R. F. Covert, city clk., sewerage system, incl. 18 in. sewers, septic tank, Hoad, Decker, Shoecraft & Drury, Ann Arbor, city engrs.

Mich., Grosse Ile—Aug. 1, by H. I. Dingman, Wayne Co. Drain Comr., Detroit, constructing Grosse Ile Tile Drain 9, Sects. 1, 2 and 3, and Grosse Ile Drain 8. Hubbell, Hartering & Roth, 2640 Buhl Bldg., Detroit, engrs.

Mich., Lansing—Aug. 5, by B. Ray, city clk., constructing East Side Relief Sewers 1 and 2; adv. E. N.-R. July 18.

Minn., Harmony—July 29, by L. B. Miller, village recdr., improving sewerage system, sewage lift, 2 motor driven sewage pumps, 4,965 ft. 8 in. and 90 ft. 10 in. pipe, 2 flush tanks, 1 inspection pipe. Noted Apr. 25.

N. J., Bogota—Aug. 8, by Mayor and Boro Council, Boro Hall, 375 Larch Ave., sedimentation tanks, pumping station at sewage disposal works. H. P. Ross, boro clk.; adv. E. N.-R. July 18.

N. J., Leonia—Aug. 12, by Bd. Boro Council, Boro Hall, repairing, enlarging North Sanitary Sewer, appurtenances. $33,000. C. Eckerson, boro engr. Noted July 11.

N. Y., Franklinville—July 27, by Bd. Village Trustees, additional treatment works at sewage disposal plant. G. R. Mills, Olean, engr.; adv. E. N.-R. July 18.

N. Y., New York—July 23, by J. J. Miller, pres. Manhattan Boro, Municipal Bldg., sewers in East 43rd St. between 3rd and Lexington Aves.

N. Y., New York—July 30, by Bd. Water Supply, Municipal Bldg., Park Row, Center and Chambers Sts., drain from uptake Chamber 2, of City Tunnel 2, at Yonkers, Westchester Co., Contr. 230. G. J. Gillespie, pres.; adv. E. N.-R. July 18.

O., Cleveland—July 24, by City, sewers in East 36th St. and Metropolitan Golf Park allotment. $50,000. R. Hoffman, City Hall, engr.

O., Warrensville (br. Cleveland) — July 22, by Village, storm and sanitary sewers, connections. C. W. Courtney, 1771 East 11th St., Cleveland, engrs.

Okla., Maud—Aug. 7, by G. B. Ingle, city clk., new sewage disposal plant. $25,000. Long & Co., 1300 Colcord Bldg., Oklahoma City, engrs.

Ont., Alliston—July 19, by M. Lowery, Town Hall, 26,500 ft. 8- to 27-in. sewers. $100,000. W. H. Seelman, Town Hall, engr. Noted June 13.

Ont., Hamilton — July 24, by W. Burton, mayor, 3,305 ft. 21- and 27-in. storm sewer in Burlington St. $45,000. W. L. McFaul, City Hall, engr.

Ont., Stratford — W. H. Riehl, engr., City Hall, taking bids 2 mechanical clarifiers in connection with new activated sludge sewage disposal plant for City. $40,000. Noted June 6.

Contracts Awarded

Calif., Escondido — Outfall sewer, sewerage pumping station, disposal work, to R. E. Burgund, 806 Rodeo Dr., Beverly Hills, $54,970. Noted Mar. 7.

Calif., Salinas — Sewerage treatment plant, pumping stations, using Dorr equipment, to E. M. Funk, Arcadia, $102,900; centrifugal rein.-con. storm drains, to Cogo & Rados, 1941 Sunset Blvd., Los Angeles, $185,975. Noted June 20.

Fla., Miami Beach — Sanitary sewers, 2 pumping stations, to Central Station Equipment Co., Seybold Bldg., Miami. Est. $82,000.

Ia., Clinton—See "Streets and Roads."

Ky., Louisville—Sewers, 1 contract, to G. M. Eady Co., Gilbert and Lee Sts., $10,330; 4 contracts, to Cannell-Conrad Constr. Co., Todd Bldg., $52,687; 1 contract, to F. G. Breslin, 32nd and Market Sts., $3,357; 3 contracts, to K. A. Barker, Floyd and Lee Sts., $11,997. Grand total $78,371.

Mass., Boston—Dpt. P. Wks., sewerage system in Washington St., Dorchester, to A. Grande, 60 Bradeen St., Roslindale; Gladstone St., East Boston, to L. Balboni, 419 Belgrade Ave., Roslindale, and Wells St., West Roxbury, to J. Williams, 8 Beechwood St., Dorchester. Est. exceeds $25,000. Noted June 20.

Mich., Grand Rapids—W. Sperry, dir. P. Service, sewage disposal plant, to A. A. Alexander & Repass Bros., 502 Frankel St., Des Moines, Ia., $617,065. Noted July 4.

N. Y., Mamaroneck—Bd. Sewer Comrs., Sewer Dist. 1, rein.-con. sludge digestion tank, to Erickson Eng. Co., Inc., 452 Lexington Ave., New York, $21,348. Noted May 9.

N. Y., New York—H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., sewers in Barnes Ave., to Trebel Constr. Co., White Plains Ave. and 213th St., $7,707; Spuyten Duyvil Rd., to Coddington Ave. Contg. Co., 2883 Coddington Ave., $35,565. Noted June 20.

N. Y., St. George—J. A. Lynch, pres. Richmond Boro, Boro Hall, sanitary sewer in Great Kills Rd., to M. C. Klostergard, $49,031. Noted June 20.

O., Bedford—Village, sewers in Ledgewood, Mapleton, West Grace, West Glendale, Corkhill and Grandmere Aves., to J. B. Lynn Constr. Co., 16112 Saranec Rd., Cleveland, $49,221—Broadmere Ave., to F. Hadded, Fidelity Mortgage Bldg., Cleveland, $5,907.

O., Gates Mills (br. Cleveland) — Village, storm and sanitary sewers in Gates Mills Blvd., east side, to Ciraci Constr. Co., 602 The Arcade, Cleveland, $54,550; west side, to Haddad-Mall Co., Hanna Bldg., Cleveland, $58,244. Noted May 16.

Ont., Islington—Etobicoke Co., 3 mi. vitr. tile sewers in Long Branch Area. Contr. 3, to R. H. McGregor Constr. Co., 261 Donlands Ave., Toronto, $12,490; Contr. 2, to G. B. Moogk, 211 Main St., Weston, $13,670; Contr. 1, to A. Cavotti & Co., 45 Jarvis St. Grand total $43,785.

Ont., Swansea—N. L. Ivey, village clk., 22,660 ft. 8- to 15-in. vitr. tile sewers, house connections, to Simone Contg. Co., Trent Ave., Toronto, $52,637; connecting sewers, to Ruscica Bros., 84 Woodycrest Blvd., Toronto, $3,305. Est. $60,000. Noted May 9.

Waste Disposal

Bids Asked

Minn., Minneapolis—July 26, by F. S. Gram, city purch. agt., 50 steel garbage tanks for Garbage Collection Dpt. N. W. Elsberg, city engr.

Contracts Awarded

N. J., Camden—City Comrs., City Hall, 140 ton refuse incinerator, Federal St. and Cooper River, to Decarie Incinerator Corp., Nelson Ave. and Rawson St., Long Island City, N. Y. Noted May 23.

Bridges

Proposed Work

Ill., Peoria—City, c/o T. R. McEntee, secy., preliminary plans repairing Upper Free Bridge, steel, concrete across Illinois River. $30,000.

Minn., Minneapolis—Rein.-con. bridge over Minnehaha Creek, on Bryant Ave. $175,000. N. W. Elsberg, city engr.

New York—State Hy. Dpt., A. W. Brandt, comr., Albany, bridge over Mohawk River between Herkimer and Mohawk.

N. Y., Lowville—State and Bd. Supervs., Lewis Co. 150 ft. span bridge on Harrisville-Fine Hy. town of Diana, $60,000. L. P. N. Gaylord, co. supt. hys.

O., Cleveland—Cleveland Union Terminal Co., Terminal Tower, rein.-con., timber railroad trestle along New York, Chicago, & St. Louis R.R., at Lakeview Rd. $125,000. H. D. Jowett, Terminal Tower, engr.

Oklahoma—State Hy. Dept., Oklahoma City, 2 span 160 ft. steel truss bridge on piers over North Boggy Creek near Stringtown, Atoka Co., $25,000—1 span 106 ft. steel truss bridge near Chelsea, Rogers Co., $30,000—1 span 80 ft. steel truss bridge at Emerson $25,000 and 6 span 96 ft. rein.-con. bridge at Elgin $30,000, both Comanche Co. J. Rightmire, acting hy. engr.

Oklahoma—State Hy. Dept., Oklahoma City, preliminary plans 22 span 3,600 ft. steel truss bridge on piers over Canadian River at Purcell, McClain Co., $600,000—3 span 145 ft. steel truss bridge on piers over Packsaddle Creek, near Cheyenne, Roger Mills Co., $30,000. J. Rightmire, acting hy. engr.

Okla., Asher—Pottawatomie Co. (Tecumseh), rejected bids 1 span 60 ft. steel truss bridge on piers. $25,000. J. H. Merkle, Tecumseh, engr. Noted July 11.

Okla., Dover—Kingfisher Co. preliminary plans 20 span 400 ft. pile trestle bridge over Cimmarron River, near here. $75,000. R. Lindsey, Kinkfisher, engr.

Texas—State Hy. Comn., R. S. Sterling, chn., Austin, 2 rein.-con. bridges on Hy. 112, F.A.P. 789-C, Karnes Co. $30,000. J. V. Canutte, Karnes City, resident engr.

Quebec—Provincial Govt., Quebec, bridge between Sorel and St. Joseph. $800,000.

Bids Asked

California—Aug. 7, by State Hy. Comn., Sacramento, seven 30 ft. span rein.-con. girder bridge over Rose Canyon, near Balboa Ave., San Diego Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Calif., Hornbrook—Aug. 5, by W. J. Nealon, clk., Siskiyou Co. (Yreka) two 80 ft. span steel bridge, abutments over Cottonwood Creek, in Klamath Dist.

Indiana—July 30, by J. J. Brown, dir. State Hy. Comn., Indianapolis, bridges in Cass, Daviess, Decatur, Delaware, Fountain, Franklin.

Constr. News page 28

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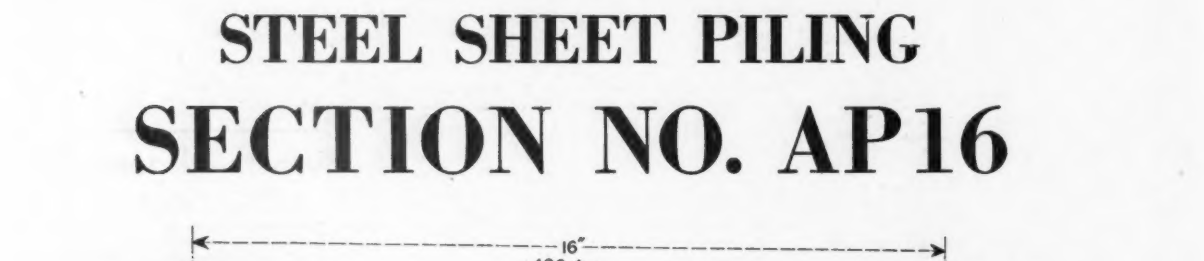

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Bridges (Continued)

Gibson, Greene, Jay, Kosciusko, Pulaski, Ripley, Tippecanoe, White, Whitley Counties.

Iowa—July 23, by State Hy. Comn., Ames, 100 x 20 ft. high truss bridge, 14 culverts, extensions U. S. Rd. 30 Carroll Co.—90 x 20 ft. pony truss bridge with two 40 x 20 ft. I-beam approaches, also 18 box culverts, extensions, B-576 Pottawattamie Co.—raising 18 x 20 ft. slab bridge, 60 x 18 ft. skew pony truss and 18 x 18 ft. I-beam bridges, also 13 culverts, extensions Rd. 161, F.A.B. 224 Linn Co.—raising 50 x 20 ft. pony truss bridge, also 3 culverts, extensions, U. S. Rd. 34, B-550 Lucas Co.—raising 14 x 24 ft. slab bridge, also 2 culverts, extensions, B-609 Webster Co.—49 culverts, extensions, Rd. 161, F-17 Dubuque Co.—18 culverts, extensions, Rd. 59, B-164 Black Hawk Co. R. F. White, hy. engr.

Michigan—July 24, by C. L. Cowgill, resident engr., Plymouth, Assessment Dist., Bridge 1 of 63-20-12, two 60 x 40 ft. spans steel deck girder, Oakland Co., for State Hy. Dpt., Lansing.

Minnesota—See "Streets and Roads."

Missouri—July 23, by State Hy. Comn., Jefferson City, concrete slab, rein.-con. deck girder bridges in Christian, Holt and St. Louis Counties. T. H. Cutler, cm. engr.

New Jersey—July 29, by State Hy. Comn., Trenton, 2 bridges on Route 34, Sect. 1, Monmouth Co., one over Gravelly Brook other over Willow Brook; two bridges over Tuckahoe River, on Route 47, Sect. 3, at Hunters Mills and Head of River, Atlantic, Cape May and Cumberland Counties. A. L. Grover, ch. clk.; adv. E N.-R. July 18.

O., Toledo—Aug. 14, at office W. H. Schroeder, dir. P. Serv., high level bridge over Maumee River; adv. E. N.-R. July 18. Noted May 30.

Oklahoma—July 29, by State Hy. Dpt., Oklahoma City, 1 span 140 ft. steel truss bridge on piers over Cache Creek, State Hy. 5, near Walters, Cotton Co. $40,000—1 span 110 ft. steel truss bridge on piers over Deer Creek near Clinton, Custer Co. $25,000—1 span 106 ft. steel truss bridge on piers over Rock Island R.R., Hy. 81, near Minco, Grady Co. $40,000. J. Rightmire, acting hy. comr.

Tex., Ft. Worth—City, c/o O. E. Carr, mgr., bids about Oct. 1, 500 to 600 ft. rein.-con. bridge over clear fork Trinity River, on Royal St. $200,000. D. L. Lewis, Ft. Worth, engr. Noted Feb. 7.

Wisconsin—July 24, by State and Washington Co. Hy. Comns., Commerce Bldg., Milwaukee, superstructure for Newbury Bridge, 227,000 lb. structural, 1,750 lb. cast steel. J. A. Stransky, div. engr.

Wis., Princeton—July 25, by State Hy. Comn., Citizens Natl. Bank Bldg., Wisconsin Rapids, Princeton Bridge over Fox River, S. T. H. 23 and 73. W. C. Buetow, div. engr.

Contracts Awarded

Alabama — State Hy. Dpt., Montgomery, small concrete bridges, Henry Co., to J. T. McLemore, Eutaw, $65,735—200 ft. underpass at Enterprise, Coffee Co., to Carter Constr. Co., Geneva, $9,053—400 ft. rein.-con. bridge, Coffee Co., to P. P. Wright, Eastport, Ga., $66,862—3 rein.-con. overhead crossings, Calhoun and Etowah Counties, to Garrett Bros., Camp Hill, $19,891. Grand total $161,541.

California — State Hy. Comn., Sacramento, rein.-con. bridges in Sacramento Co., to Griffith & Hunter, Sacramento, $126,851—Shasta Co., to Carlson Bros., Turlock, $19,979—Tehama and Shasta Counties, to Bodenhammer Constr. Co., San Diego, $159,827—Monterey Co., to B. C. Gerwick, Inc., 112 Market St., San Francisco, $233,107—Marin Co., to W. L. Proctor, Santa Rosa, $27,961—Alpine Co., to Camino Constr. Co., Palo Alto, $17,536—2 in San Bernardino Co., to W. J. Nethery & Son, Riverside, $33,171. Grand total $618,432. Noted June 6 and 13.

Iowa—State Hy. Comn., Ames, bridges in Davis Co., to E. A. Kramme Co., Des Moines, $4,444—Pottawattamie Co., to Wickam Bridge & Pipe Co., 1905 West Bway., Council Bluffs, $10,920—raising bridge, Wapello Co., to A. Olson Constr. Co., Waterloo, $11,965—culverts and slab in same county, to C. J. Kramme, Ft. Dodge, $8,662—culverts in Adams Co., to McCormick Constr. Co., Lohrville, $11,325—Clarke Co., to J. F. Adams, Osceola, $2,640—Fremont Co., to Wilson Constr. Co., Red Oak, $5,300. Grand total $45,256. Noted June 20.

Ia., Le Mars—See "Streets and Roads."

Ia., Sidney — Fremont Co., 3 high truss bridges, approaches, foundation piling, to Jensen Constr. Co., Kimballtown, $55,497.

Kansas—State Hy. Dpt., Marion and Greensburg, bridges in Barton Co., to Shuss & Henderson, Larned, $2,971—Comanche Co., to Thormartin & Reis, Ft. Scott, $8,421—Cowley Co., to Vaughn Stuart, Dodge City, $54,564—Kiowa Co., to M. R. Amerman, 248 North Market St., Wichita, $18,272—Marion Co., to Campbell Bros., 608 Manufacturers Exch. Bldg., Kansas City, $8,302—Cloud Co., to Campbell & Lachenmaier, Miltonvale, $1,485. Grand total $94,015. Noted June 20.

Kansas—State Hy. Dpt., Osborne and Dodge City, bridges in Ellis Co., to Schlichter & Show, Clay Center, $16,966 — Osborne and Phillips Counties, to Young & Hall, Maywood, Neb., $37,506—Smith Co., to Kelly & Johnson, $11,116—Smith Co., to C. Beardslee, $13,011. Grand total $78,599.

Kentucky — State Hy. Dept., Frankfort, to Cordell Constr. Co., Winchester, 2 rein.-con. substructures in Letcher Co., one $10,432, other $9,300, 2 in Perry Co., one $8,636, other $9,280—to Vincennes Bridge Co., Vincennes, Ind., 2 steel superstructures in Letcher Co., one $11,233, other $8,332, 2 in Perry Co., one $13,822, other $8,332—to Hay & Campbell, Booneville, Ind., steel superstructure in Greene Co. $16,660—to J. U. Schickli & Bros., 1837 Greenwood Ave., Louisville, rein.-con. bridge in Washington Co. $25,859. Gand total $121,886. Noted June 13.

Maine—State Hy. Dpt., Augusta, Bear River Bridge at Newry, to Wyman & Simpson, Augusta, $20,423. Est. $25,000. Noted May 30.

Massachusetts—Commonwealth of Massachusetts, Dpt. P. Wks., Boston, 3 span rein.-con. bridge over Charles River, in Newton and Wellesley, to F. T. Ley Co., Inc., 20 Providence St., Boston, $88,223.

Montana—State Hy. Comn., Helena, removing bridges, constructing pile trestles in Phillips Co., to E. R. Hays, Bozeman $26,281—542.5 ft. viaduct, Silver Bow Co., to C. Goddard, Butte $85,605—bridges, Wheatland and Golden Valley Counties, to P. W. Hastings, Billings $5,919. Grand total $117,805.

Ohio—R. N. Waid, dir. Hys., Columbus, concrete slab bridges in Allen Co., to I. P. Core, Bellefontaine, $7,199—Jackson Co., to Brewer & Brewer, Chillicothe, $3,646—steel truss bridge, Athens Co., to Dodge-Hussey, Inc., Columbus, $24,522—concrete beam bridges, Columbiana Co., to Lewis & Copeland, Lima, $47,798—Fairfield Co., to Adams Bros., Constr. Co., Zanesville, $24,023—concrete girder bridge in Huron Co. and widening concrete bridge in Summit Co., to W. A. Yeagle, Clyde, $6,653 and $16,672 respectively—concrete bridge, Muskingum Co., to E. L. Paul, Zanesville, $11,942—grade separation in Clark Co., to J. T. Smith, 16 Fillmore St., Dayton, $78,799—crossing over Pennsylvania R.R. Sect. North St. Bridge, Noble Co., to W. J. Elliott, Morgan, $26,176. Grand total $247,430. Received no bids June 29, removing brick and base, laying new base and relaying old brick on 1 mi. Sect. G Athens-McArthur Rd., Athens Co., $10,640—rejected bids June 29, paving 5.473 mi. Sect. A Jerusalem Rd., Lucas Co., brick incl. brick $399,427, concrete $317,900—cancelled bids to have been opened June 29, concrete beam bridge over Anderson Creek, and bridge over Dugan Run, Champaign Co., $10,676 and $7,358 respectively. Noted June 20.

Oklahoma—State Hy. Dept., Oklahoma City, to McKey & Hopper, Blanchard, 3 bridges in McCurtain Co., one at Smithville $29,388, est. $35,000, one near Bethel $27,462 est. $35,000 other near Bethel $35,383 est. $40,000. Grand total $92,233. Noted June 27.

Pa., Pittsburgh—Comrs, Allegheny Co., Court House, sub-structure for McKees Rocks-Northside Bridge, to Dravo Contg. Co., Neville Island, Pittsburgh, $1,780,150. Noted July 11.

Texas—G. Gilchrist, state hy. engr., Austin, rein.-con., steel bridge Wharton Co., and 2 rein.-con. bridges Cherokee Co., to Austin Bridge Co., P. O. Box 1094, Dallas, $246,139 and $71,009 respectively—rein.-con., steel bridge Goliad Co., and 2 rein.-con. bridges, Victoria Co., to W. L. Pearson & Co., Edinburg, $74,804 and $91,581 respectively—steel, concrete drainage structures on hy. in Palo Pinto and Erath Counties, to Maney & Alley, Empire Bldg., Oklahoma City, Okla., $44,756. Grand total $528,289. Noted June 20.

Tex., Dallas—Dallas Co., c/o C. E. Gross, aud., rein.-con. bridge over Trinity River, on Commerce St., to Austin Bridge Co., P. O. Box 1094, $458,211. Est. $530,000. Noted June 20.

Vermont—State Hy. Dpt., Montpelier, 180 ft. steel truss span bridge in Jamaica, to D. S. McGrath, Inc., Adams, Mass., $33,343; 122 ft. steel truss span bridge, Warren, to General Cons. Service, Inc., St. Albans, $37,803. Noted June 27.

Vt., Moretown—Town, Bd. Selectmen, steel truss bridge, to D. B. Riggs, Troy, N. Y. Est. $25,000.

West Virginia—State Hy. Comn., Charleston, bridges Mason Co., to Price Constr. Co., Huntington, $28,288—Pleasants Co., to C. C. Dodd, Spencer, $22,554 — Doddridge Co., to Salem Concrete Co., Salem, $22,770—Ohio Co., to H. L. Seabright Co., Wheeling, $3,764—Pleasants Co., to O. R. Hardman, Spencer, $3,354—superstructure Preston Co., to E. R. Mills, Charleston, $19,400. Grand total $100,130. Noted June 13.

Wyoming—See "Streets and Roads."

Ont., Thorold—Dpt. Railways & Canals, Ottawa, bridge over Welland Canal, to Hamilton Bridge Co., $163,000.

Railways

Proposed Work

Colorado—Colorado R.R. Co. subsidiary Colorado & Southern Ry. Co., R. C. Gowdy, Denver, ch. engr., constructing 4.7 mi. addition to Ingleside Branch. $110,000.

Louisiana—Elizabeth Southern Railway Co., R. M. Hallowell, pres., and R. C. Fulbright, atty., Transportation Bldg., Wash., D. C., constructing 30¼ mi. railroad from Elizabeth to Kinder.

Missouri—Missouri, Kansas & Texas R.R., F. Ringer, ch. engr., St. Louis, 4.5 acre freight yard, incl. 5 mi. yard trackage, also freight house, Kansas City. $1,000,000.

Oregon — Southern Pacific Ry. Co., G. W. Bosche, ch. engr., San Francisco, Calif., double tracking Springfield-Eugene Line; reconstructing yards in Eugene, incl. stock yard, extra trackage, equipment. $750,000.

Contracts Awarded

Indiana—Cleveland, Cincinnati, Chicago & St. Louis Ry. Co., H. Baldwin, ch. engr., Big Four Bldg., Cincinnati, O., double tracking 21 mi. line from Whitestown to Lebanon, and 8¼ mi. line from Terre Haute to Sandford, incl. 5 bridges, to Walsh Constr. Co., 114 West 3rd St., Davenport, Ia. $2,000,000 and $3,000,000 respectively. Noted June 13.

Airports

Proposed Work

Mass., East Boston (sta. Boston)—Curtiss Flying Service, Garden City, N. Y., revised plans by G. W. Hartlett, 103 Park Ave., New York, hangar.

N. Y., Auburn—City, C. D. Osborne, mayor, municipal airport.

O., Cleveland — Austin Co., 16112 Euclid Ave., 1 story, 120 x 200 ft., brick, steel, concrete airplane hangar, Municipal Airport. $125,000. Private plans.

R. I., Warwick—State Airport Comn., H. T. Bardwell, Hospital Trust Bldg., airport, on 350 acre site, Boston Post Rd. and Warwick Ave. $200,000. Engineer not selected. Noted May 23.

Tex., Brownsville — See "Buildings — Industrial."

Tex., Ft. Worth — Voted $500,000, airport, D. L. Lewis, city engr. Noted June 6.

Tex., Nacogdoches—Chamber of Commerce, c/o N. R. Brown, airport.

Tex., Raymondville — Airways Extension Service, Dpt. Commerce, Wash., D. C., hangars, beacon lights.

Contracts Awarded

Mass., Agawam — Agawam Airport, Inc., H. L. Bowles, Springfield, brick hangar building, to L. S. Wood, 14 Stockbridge St., Springfield. Est. $135,000. Noted July 18.

Minn., Duluth—City Comrs., 640 acre airport at Work Farm site, on Miller Trunk Rd., 3 mi. from here, to E. C. Dahlquist Constr. Co., Minneapolis, $65,978.

N. J., Secaucus—New York Air Terminal, Inc., W. F. Cary, pres., 44 Wall St., New York, sub-contract workshops, hangars, administration building, to McGraw Constr. Co., Peekskill, N. Y. Est. $8,000,000. Noted Apr. 4 under "Contracts Awarded."

Tex., Graham—Airport Com., c/o A. A. Morrison, chn., 2 story hangar, to C. Cochran, Graham.

Excavation, Drainage, Irrigation, Levees,

Proposed Work

Minn., Warren—State Drainage & Waters Comn., Old Capitol Bldg., St. Paul, reconstructing State Ditch 2, 347,222 cu.yd. excav., leveling waste banks, reconstructing, extending 5 bridges, culverts, thirteen 24- to 30-in. automatic flood gates, Marshall Co. $47,728.

N. J., Alpine — Palisades Interstate Park Comn., 25 Bway., New York, will not build boat basin. This corrects report in July 4 issue.

Bids Asked

Illinois—Aug. 1, by S. Sorells, Raymond, and H. J. Wernsing and J. Smith, both Harvel, comrs. Blue Grass Creek D. D., Court House, Hillsboro, 2,700 ft. main ditch and 3 1/3 mi. lateral ditch work, incl. 20,442 cu.yd. excav., Montgomery Co.

Ia., Garner—July 23, by C. Jacobs, aud. Hancock Co., 109,840 cu.yd. excav. in Drainage Ditch 13.

Mass., Brookline—July 22, by Bd. Selectmen, Town Hall, concrete channel from Riverdale Parkway to Coolidge Corner. $25,000 or more.

Mich., Davison—July 26, by A. H. Reid, drain. comr. Genesee Co., at oil station corner Lapeer and State Rds., near here, 479.12 rods tile work, 8,900 ft. 18- to 24-in. No. 1 drain tile, three 20 in. and four 24 in. sewer pipe receivers, for Long Lake Drain.

N. Y., Albany—July 30, by F. D. Roosevelt, gov. and chn. State Office Sites & Building Comn., Executive Chamber, Capitol, retaining wall for State Office Building; adv. E. N.-R. July 18.

O., Cincinnati—July 29, by Cincinnati Union Terminal Co., Terminal Tower, grading 6,000,000 cu.yd., to fill Mill Creek bottoms.

Wis., Milwaukee—July 22, by Milwaukee Co. Drainage Com., 1422 1st Wisconsin Bank Bldg., completing Farm Drain 26. H. C. Webster, Milwaukee, engr.

Ont., Mitchell—July 29, by J. A. Rudolph, clk. Logan Twp., R. R. 4, Northwest Drain, 38,400 lin.ft. ditching, 8 to 20 ft. bottom width. $75,000. J. Roger, Mitchell, engr.

Contracts Awarded

Fla., Miami Beach—Indian Creek Golf Club, seawall to Shore-Line Builders, Inc., Liggett Bldg., Jacksonville. Est. $100,000.

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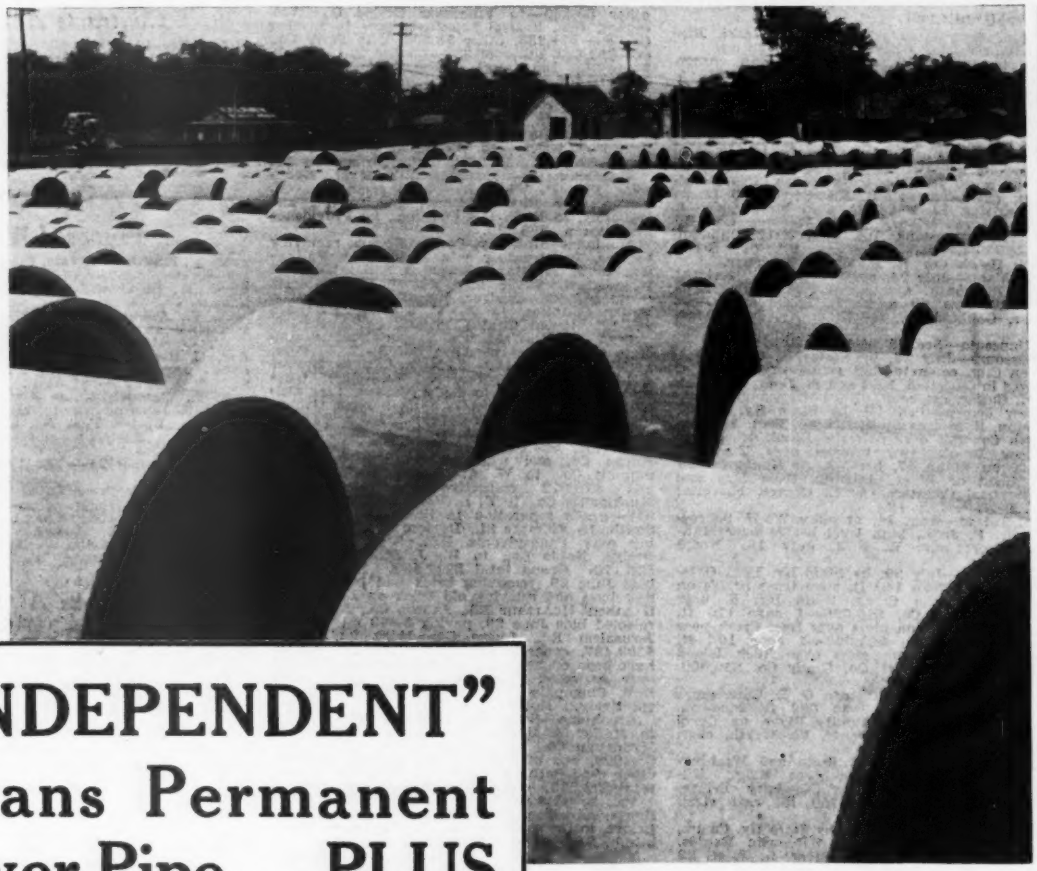

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Excavation, Drainage, Irrigation, Levees, River and Harbor (Continued)

La., Houma — Gravity D. D. 2, Terrebonne Parish, c/o C. P. Boudreaux, pres., dredging 7 mi. Bayou La Carpe from intersection with Intra-Coastal Canal, to Bayou Grand Calliou, to Huth Constr. Co., Franklin, $12,950. Noted May 23.

Streets and Roads

Bids Asked

Ark., Texarkana—July 24, by Comrs. Paving Dist. 53, c/o B. E. Carter, 420 State Natl. Bank Bldg., grading, concrete paving 10,000 sq.yd. J. W. Dawson, 425 State Natl. Bank Bldg., engr.

California—Aug. 7, by State Hy. Comn., Sacramento, grading, concrete paving 7 mi. Orange Co.—grading, bituminous surface treating 2.2 mi. Mono Co.—bituminous macadam paving 3.1 mi. Napa Co.—grading, bituminous macadam paving 11.3 mi. Placer Co.—grading 9.3 mi. San Diego Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Calif., San Gabriel—July 30, by City, paving curbing, walks, 1½ in. Warrenite on 2½ in. asphaltic concrete paving 434,448 sq.ft. Live Oak St.

Ga., Monticello—July 23, by City c/o E. C. Kelly, mayor, City Hall, sidewalks, driveways, sewers, vibrolithic concrete paving 12,031 sq.yd. K. T. Thomas, 611 McGlawn-Bowen Bldg., Atlanta, engr.

Ill., Greenville—Bids about Aug. 15, grading, curbing, concrete paving 16,000 sq.yd. 1st, 2nd, Locust and Main Sts. $35,000. H. N. Baumberger, Greenville, engr.

Ind., Bloomfield—Aug. 6, by Comrs. Greene Co., constructing Freel H. Bullock and John R. Weaver et al., Rds. $35,000. G. R. Hudson, co. aud.

Ind., Crown Point—July 22, by Comrs. Lake Co., grading, concrete paving H. E. Sasse et al., Road 1. $112,000. W. E. Whitaker, co. aud.

Ind., Evansville—Aug. 1, by Bd. Comrs. Vanderburgh Co., improving Koressel Rd., $10,721; Corbierre Ave. Rd. $11,946, both Perry Twp. S. B. Bell, co. aud.

Ind., Marion—Aug. 6, by Comrs. Grant Co., grading, paving A. E. Ballinger Rd., $70,665; A. A. Mittank Rd., $16,615, both Jefferson and Monroe Twps. A. J. Green, co. aud.

Ind., New Albany—Aug. 5, by Comrs. Floyd Co., grading, stone paving Smith Rd. in Lafayette Twp., $20,000; Starlight and St. John's Rd. $29,000. W. G. Dieckmann, co. aud.

Ind., South Bend—Aug. 5, by Bd. Comrs. St. Joseph Co., constructing Beech Rd. $57,000. F. P. Crowe, aud.

Iowa—July 23, at office H. H. Smith, maintenance supt., Algona, 3,500 cu.yd. gravel 1 mi. haul, 23,850 units overhaul, 1,200 cu.yd. stripping.

Iowa—July 23, by State Hy. Comn., Ames grading, flumes, paving 51.177 sq.yd U. S. Rd. 71, F-52 Audubon Co.—99,140 sq.yd. U. S. Rd. 30, P-630-A Boone Co.—15,766 sq.yd. Primary Rd. 7, P-575 and 55,536 sq.yd. same road, P-298 Pottawattomie Co.—104,192 sq.yd. Primary Rd. 7, P-154 Shelby Co.—7,942 sq.yd. U. S. Rd. 55, P-177 Winneshiek Co.—grading 1,238 mi. Primary Rd. 14, P-167-E Butler Co. —4.941 mi. New Haven Rd., P-628 Mitchell Co.—graveling 5.26 mi. Primary Rd. 8, P-470 Benton Co.—3.1 mi. Primary Rd. 38, F-234-A Jones Co.—5 mi. U. S. Rd. 63, P-510 Mahaska Co.—8.56 mi. Primary Rd. 8, P-309 Tama Co. R. F. White, hy. engr.

Ia., Creston—July 23 (extended date), by B. Tallman, city clk., concrete, asphaltic concrete, sheet asphalt, brick, warrenite or amiesite paving 19,100 sq.yd. and repaving 39,404 sq.yd. P. K. De Voe, City Hall, engr. Noted July 11.

Ia., Montezuma—Clerk Poweshiek Co., bids about July 25, graveling 11 mi. Brooklyn-Chelsea Rd. $33,000. C. E. Olson, Montezuma, co. engr.

Ia., Montezuma—Clerk Poweshiek Co. bids about Aug. 15, graveling 10.5 mi. roads. $32,000. C. E. Olson, Montezuma, co. engr.

Kansas — July 24, by State Hy. Dpt., at Mound City, grading, culverts 7.1 mi. K-96-K, Project 810, 30 ft., Columbus Co.—concrete surfacing 2.989 mi. U. S. Rd. 73-E, F. A. P. 213-D, 18 ft., Paola Co. W. V. Buck, Topeka, hy. engr.

Kan., Kansas City—July 22, by Clerk Wyandotte Co., rock asphalt on concrete paving 0.975 mi. oRad 47, concrete or bituminous macadam paving 2 mi. J. T. Gunter Rd., both 18 ft. O. K. Williamson, Court House, engr.

La., St. Joseph — Aug. 14, by Police Jury Tensas Parish, G. M. Clinton, secy., clearing, grubbing, bridging, gravel surfacing 23.85 mi. Tensas Bluff South Rd. Noted Nov. 22.

Maryland—July 23, by State Rd. Comn., Baltimore, concrete paving 1 mi. Contr. C1-62, Carroll Co.—1 mi. Contr. Q-46, Queen Anne's Co.—0.2 mi. Contr. H-73, Hartford Co.—6.1 mi. Contr. K-39, Kent Co.—2.7 mi. Contr. M-125, Montgomery Co.—grading 5.5 mi. Contr. W-1-D, Washington Co. H. Miller, Jr., Federal Reserve Bank Bldg., engr.

Massachusetts — July 23, by Dpt. P. Wks., Boston, bituminous macadam paving 38,611 ft. hy. in Medway, Holyoke, Westfield, and Lexington—bituminous macadam, rein.-con. paving 2,600 ft. North Adams—gravel, bituminous macadam paving 4,900 ft. Bellingham. A. W. Dean, Dpt. P. Wks., Boston, engr.

Mass., Boston — July 24, by Dpt. P. Wks., sheet asphalt or bitulithic paving Wards 11 and 20. $25,000. J. H. Sullivan, comr.

Mass., Boston—July 25, by Dpt. P. Wks., sheet asphalt or bitulithic paving Ward 16; July 26, in Ward 7. $25,000 or more. J. H. Sullivan, comr.

Mass., Brookline—July 22, by Bd. Selectmen, Town Hall, sheet asphalt paving Harvard St. $25,000.

Michigan—July 24, by K. A. Beers, resident engr., Kalamazoo, grading, concrete paving 1.8 mi. Project MO3-20C-1, Allegan Co., 20 ft. for State Hy. Dpt., Lansing.

Michigan—July 23, at office E. R. Benkart, resident engr., Port Huron, widening, concrete paving 1.814 mi. Mo-79-5 C-1, 20 ft., Tuscola Co., for State Hy. Dpt., Lansing.

Michigan—July 23, at office A. R. Schaefer, resident engr., Newberry, concrete paving 7.164 mi. FO-49-16 C-1, 20 ft., Mackinac Co., for State Hy. Dpt., Lansing.

Michigan—July 31, by C. L. Cowgill, resident engr., Plymouth, concrete paving 7.487 mi. Project A-D484C-1, Lenawee, Monroe and Washtenaw Counties, for State Hy. Dpt., Lansing.

Michigan — July 31, at office H. I. Davis, resident engr., Escanaba, concrete paving 3.493 mi. Mo-21-6 C4, 20 ft., Delta Co., for State Hy. Dpt., Lansing.

Michigan—July 31, by H. C. Fleming, resident engr., Grand Rapids, concrete paving 1.018 mi. Project Mo41-26-C-1, Kent Co., for State Hy. Dpt., Lansing.

Michigan — Aug. 1, by H. I. Davis, div. engr., Escanaba, grading, paving 6.846 mi. Delta Co., for State Hy. Dpt., Lansing.

Michigan—Aug. 1, by H. I. Davis, div. engr., Escanaba, grading, paving 8.069 mi. Project FO55-4C-1, Menominee Co., for State Hy. Dpt., Lansing.

Michigan — Aug. 1, by R. R. Havens, resident engr., Jackson, concrete paving 5.166 mi. Project MO13-19-1, Calhoun Co., 20 ft., for State Hy. Dpt., Lansing.

Michigan—Aug. 1, by R. R. Havens, resident engr., Jackson, concrete paving 0.969 mi. Project MO13-18-C-2, Calhoun Co., for State Hy. Dpt., Lansing.

Mich., Detroit—July 22, by Bd. Comm. Wayne Co., grading, concrete paving 3.4 mi. in Redford and Livonia Twps.—3 mi. between Dearborn and Redford Twps.—8.5 mi. Redford, Livonia and Plymouth Twps., all 20 ft. wide. L. Smith, Barium Bldg., engr.

Minnesota—July 30, by State Hy. Comn., St. Paul (**S.P. means State Project, F.A.P. Federal Aid Project**), concrete paving 39,231 sq.yd. S.P. 3-35-3 Div. A, Winona—grading 850,000 cu.yd. S.P. 35-27, A and B, F.A.P. 404-C—196,000 cu.yd. S.P. 12-26-3, F.A.P. 350-C—220,500 cu.yd. S.P. 15-31, F.A.P. 417-A—grading 225,500 cu.yd., constructing Bridge 4912, 85 ft. and Bridge 4915, 60 ft., S.P. 22-26-3, F.A.P. 338-D.

Miss., Holly Springs — July 26, by Mayor, curbing, guttering, grading, footwalks, concrete paving 9,500 sq.yd.

Missouri—July 23, by State Hy. Comn., Jefferson City, paving 20.825 mi. roads in Christian, Holt, Pulaski and St. Louis Counties. T. H. Cutler, ch. engr.

Mo., Clayton — July 24, by St. Louis Co. Court, Court House, grading, rein.-con. paving 6,900 sq.yd. St. Louis Co. Hospital Grounds, North and South Rd. R. Jablonsky, Court House, co. engr.

Mo., Macon—July 24, by City, grading, rein.-con. paving 6.5 blocks Sheridan St., 24 ft. W. McDuffey, City Hall, engr.

New Hampshire—July 19, by State Hy. Dpt., Concord, 3 in. bituminous macadam on 8 in. gravel paving 1.35 mi. Cintoocook Valley. $43,000. E. S. Hastings, Keene, engr.

N. J., Interlaken (mail Allenhurst)—Aug. 12, by Boro Council, rein.-con. paving 11,656 sq.yd. Grasmere Ave. J. H. Emlen, boro engr.; adv. E. N.-R. July 18. Noted May 8.

N. J., Lyndhurst (br. Rutherford)—July 22, by Bd. City Comrs., City Hall, curbing, guttering, sidewalks, macadam paving Livingston St.; sidewalks, 8 in. rein.-con. paving Court Ave. $25,000. T. F. Bowe, Assn. Bldg., East Rutherford, twp. engr.

N. J., Toms River — July 23, by Bd. Freeholders Ocean Co., Court House, improving 7.12 mi. road from Cedar Bridge to Manahawkin; 5 mi. road from Lakehurst to Whitings. H. Shinn, Lakewood, co. engr.

New York—July 19, by A. W. Brandt, comr. Hys., Albany, improving hys. in Columbia and Westchester Counties; reconstructing hys., bridges in Chenango, Columbia, Dutchess, Essex, Monroe, Onondaga, Saratoga and Ulster Counties; adv. E. N.-R. July 18.

N. Y., Brooklyn—July 24, by J. J. Byrne, pres. Brooklyn Boro, Boro Hall, cinder or gravel ing 9.745 sq.ft. Ten Eyck St.—bituminous macadam paving 2,405 sq.yd. East 38th St.—121,000 sq.yd. Elmore Pl., East 36th St., Quentin Rd., Avenues R, S and M—asphalt paving 2,877 sq.yd. Atlantic Ave.—2,946 sq.yd. Bedford Ave., 30,311 sq.yd. Flatbush Ave.—4,918 sq.yd. Flatlands Ave.—3,873 sq.yd. Newkirk Ave., 3,022 sq.yd., Schenectady Ave.—1,166 sq.yd. Sutter Ave.—4,250 sq.yd. Troy Ave. — 6,048 sq.yd. Avenue J—5,230 sq.yd. East 37th St.—2,668 sq.yd. Midwood St.—5,817 sq.yd. West 6th St.—709 sq.yd. East 40th St.

N. Y., Buffalo—July 25, by G. Fisk, comr. P. Wks., Municipal Bldg., concrete paving Chicago St. Playground, Chicago St. and Myrtle Ave. C. E. P. Babcock, city engr.

N. Y., Little Falls—July 24, by J. F. Newitt, city clk., curbing, concrete paving 3rd, 5th, School, South 2nd, East Mill, Skinner, Catherine, East Petrie, Moreland, Church Sts., Glen and Woodside Aves.; adv. E. N.-R. July 18.

N. Y., Long Island City—July 22, by G. U. Harvey, pres. Queens Boro, 69 Hunterspoint Ave., steamed ash surfacing 10,500 cu.yd. Bergen Landing, Kew Gardens Rds., 130th St., Hillside, 114th, Brinkmeyer, Liberty Ave.—240 cu.yd. 97th St.—sheet asphalt paving 4,600 sq.yd. 133rd St.—2,120 sq.yd. 90th St.—granite block paving 2,000 sq.yd. 44th Rd.—sewer in 42nd (Madden) St.

N. Y., New York—July 23, by H. Bruckner, pres. Bronx Boro, Boro Hall, Crotona Park, 3rd and Tremont Aves., granite block on concrete paving 11,320 sq.yd. East 133rd St.—900 sq.yd. East 136th St.—27,500 sq.yd. 3rd Ave.—33,500 sq.yd. Jerome Ave.

N. Y., New York—July 23, by J. J. Miller, pres. Manhattan Boro, Municipal Bldg., New York, grading, curbing, sheet asphalt paving 1,130 sq.yd. West 189th St.—recut granite paving 140 sq.yd. Water St.—7,130 sq.yd. Bway.—1,090 sq.yd. South William St.

N. Y., Yonkers — July 31, by Westchester Co., Park Comn., 72 West Pondfield Rd., Bronxville, grading, 1.75 mi. Cross Country Parkway from Valentine Ave. to Broad Street Viaduct. L. G. Holleran, acting ch. engr.; adv. E. N.-R. July 18.

O., Beachwood (br. Cleveland)—July 29, by Village, paving East Groveland, East Baintree, Cedarview, Lyndway and East Silsby Rds. $75,000. C. N. Courtney, 1771 East 11th St., Cleveland, engr.

O., University Heights (br. Cleveland)—July 22, by Village sidewalks on 12 streets, $30,000. F. A. Pease Eng. Co., Terminal Tower, Cleveland, engrs.

Oklahoma—July 29, by State Hy. Dpt., Oklahoma City, sheet asphalt or concrete surfacing 54,000 sq.yd. Sayre-Beckham Rd., U. S. Hy. 66, Beckham Co. $110,000—concrete paving 27,000 sq.yd. Taft Rd., U. S. Hy. 64, Muskogee Co. $55,000—53,800 sq.yd. Avant Rd., State Hy. 11 and 16,100 sq.yd. Taft Rd., U. S. Hy. 64, Osage Co. $110,000 and $33,000 respectively—53,870 sq.yd. Seminole Rd., and 42,600 sq.yd. Pottawatomie Co. line Rd., Seminole Co., $100,000 and $80,000 respectively—42,580 sq.yd. Morrison Rd., U. S. Hy. 63 and 31,760 sq.yd. Noble Co. line Rd., U. S. Hy. 64, Pawnee Co. $90,000 and $67,000 respectively—grading 7 mi. Gracemont Rd., and 8 mi. Anadarko Rd., State Hy. 8, Caddo Co. $35,000 and $40,000 respectively—4 mi. Norman Rd., State Hy. 37, Cleveland Co. $25,000—7 mi. Coalgate Rd., and 7 mi. road south from north line, U. S. Hy. 75, Coal Co. $30,000 and $35,000 respectively—8 mi. Walters Rd., State Hy. 5, Cotton Co. $35,000—7 mi. Vinita Rd. and 6 mi. Welch Rd., U. S. Hy. 73, Craig Co. $30,000 and $25,000 respectively—7 mi. Sapulpa-Kiefer Rd., State Hy. 75, Creek Co. $35,000—7 mi. State Hy. 11, Mayes Co. $50,000—8 mi. South Canadian River Rd., State Hy. 37, McClain Co. $40,000—6 mi. Dewar Rd., State Hy. 9, Okmulgee Co. $25,000—7 mi. Coweta Rd., and 8 mi. Wagoner Rd., State Hy. 11, Wagoner Co., $50,000 and $45,000 respectively. J. F. Rightmire, acting hy. engr.

Pa., Norristown—July 29, by F. L. Smith, clk. of Council, City Hall, 7 in. rein.-con. paving Marshall St.—6 in. one course rein.-con. or bituminous concrete paving Blackberry St., Rapp Alley—filbertine on present brick paving Arch St.; adv. E. N.-R. July 18.

Pa., Phila. — July 23, by Dpt. P. Wks., Bureau Hys., A. Murdock, dir., City Hall Annex, asphalt paving; asphalt resurfacing (heater method).

Pa., Pittsburgh—July 29, by W. Wimmer, secy. Hamilton School, Perryaville Rd. and Cemetery Lane, Ross Twp., Allegheny Co., grading 2,500 cu.yd., paving 3,000 sq.yd. East Forest Ave., Ross Twp. McCully Eng. Co., 709 Berger Bldg., Pittsburgh, engrs.

Tex., Texarkana—July 24, by Street Impvt. Dist. 3, c/o B. E. Carter, 420 State Natl. Bank, grading, curbing, guttering, concrete paving 20,000 sq.yd.

Virginia — July 23, Dpt. Hys., Richmond, grading 0.7 mi. Project F143B — macadam paving 3.5 mi. Project F412—2.2 mi. Project F488—rock asphalt paving 0.7 mi. Project S580C — concrete spans Project F189; adv. E. N.-R. July 18.

Virginia—July 30, at office Dpt. Hys., Richmond, macadam paving 7.5 mi. Washington Co. —1 mi. Augusta Co.—rock asphalt paving 1 mi. Shenandoah Co.

Washington—July 30, by State Hy. Comn., Olympia (**S.R. means State Road, F.A.P., Federal Aid Project**), grading 412,270 cu.yd. S.R. 12, F.A.P. 167-E, Wahkiakum Co.—15,770 cu.yd. same road, Cowlitz Co.—276,950 cu.yd. crushed stone surfacing 20,400 cu.yd. S.R. 2, F.A.P. 114-G, and crushed stone surfacing 35,840 cu.yd. S.R. 2, both Kittitas Co. —14,680 cu.yd. S.R. 12, Cowlitz Co.—33,970 cu.yd. S.R. 9, Sect. 2, F.A.P. 170-A, Clallam and Jefferson Counties crushed stone resurfacing 1,865 cu.yd. same road, Clallam Co.—concrete paving 1.8 mi. S.R. 1, King Co.—2.8 mi. S.R. 14, Kitsap Co.—5.2 mi. S.R. 9, Thurston Co.—4.4 mi. S.R. 1, Snohomish Co. S. J. Humes, dir.

W. Va., Fayetteville — Aug. 7, by Court Fayette Co., surfacing 3 mi. Project S-MT-Q-62; 2 mi. Project K-51-B; adv. E. N.-R. July 18.

W. Va., Moundsville—July 30, at office clerk Marshall Co., bituminous resurfacing 2 mi. Fairmont Pike Rd.—creek graveling 2 mi. Reed Ridge Rd.—2 mi. Bowman Ridge Rd.—1 mi. Cameron Ridge Rd.—sandstone paving ½ mi. Dry Ridge Rd.

Ont., Welland—July 22, by Ross & Scott, engrs., 89 Main St. E., 3 in. asphaltic concrete on waterbound macadam paving 25,000 sq.yd. $50,000.

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Streets and Roads (Continued)

Contracts Awarded

California — State Hy. Comn., Sacramento, grading, concrete paving 4.1 mi. Madera Co., to Valley Paving & Constr. Co., Visalia, $164,511—5.1 mi. San Joaquin Co., to C. W. Wood, Stockton, $141,525—grading, untreated crushed rock surfacing 3 mi. Mono Co., to Montfort & Armstrong, Sacramento, $26,332—grading 9.3 mi. Placer and Nevada Counties, to T. E. Connolly, 461 Market St., San Francisco, $396,385; grading, crushed stone or graveling 0.3 mi. Alpine Co., to Camino Constr. Co., Palo Alto, $17,536. Grand total $746,289.

Calif., Los Angeles—Grading, asphaltic concrete paving Mulholland St., to G. R. Curtis Paving Co., 2440 East 26th St., $129,731.

Calif., San Francisco — Grading, asphaltic concrete paving 189,730 sq.ft. Portola Dr., to Fay Impvt. Co., Phelan Bldg., $121,322.

Ill., Decatur — Granite-concrete paving 7 blocks Huron, Garfield and Lowwber Sts., to File & Collins, Milliken Bldg., $29,326; 2 blocks Bway., to Birt & Driscoll, Decatur, $12,224.

Ill., Galesburg—Ontario Twp., A. R. Smith, hy. supt., grading 16 mi. roads, to T. O. Miles, 556 Mulberry St., Galesburg, $48,480. Est. $50,000. Noted June 13, under Ontario.

Indiana—State Hy. Comn., Indianapolis, concrete paving 7.76 mi. Project 179, Fulton Co., to Roger Daoust, Defiance, O., $137,442, est. $167,916; grading 0.516 mi. Project 158-A-1, Jasper Co., to R. Reise, Milwaukee, Wis., $17,837, est. $24,955.

Ind., Gary—Bd. Wks., paving, to B. C. Milbrath, Gary, $35,194.

Ind., Indianapolis — Bd. Comrs. Marion Co., concrete paving 3.02 mi. College Ave., to W. D. Vogel, 702 West Morris St., $73,250. Est. $108,000. Noted June 27.

Ind., Laporte — Comrs. Laporte Co., constructing A. Snyder Rd., to A. W. Taylor Constr. Co., Laporte, $158,346.

Ind., Valparaiso—Porter Co., to G. M. Gilcuddy, concrete paving Wagner Rd., $38,740; Snook Rd., $16,800; stone paving Lee Rd., $23,000—to G. W. Welch, Gary, Thatcher Rd., $21,601—to R. De Mass, Chesterton, Ryan Rd., $27,800. Grand total $127,941. Noted June 6.

Iowa—State Hy. Comn., Ames, paving 13.92 mi. roads in Crawford Co., to W. Horrabin Constr. Co., Iowa City, $348,341—10.842 mi. Page Co., to O'Rourke Constr. Co., 1118 Mulberry St., Des Moines, $275,474—12.905 mi. Union Co., to Capital Constr. Co., 1118 Mulberry St., Des Moines, $342,335. Grand total $966,150. Noted June 20.

Ia., Clinton—For 7 in. rein.-con. paving 11,550 sq.yd. 15th Ave. and Comanche St., to Star Coal & Impvt. Co., Hobson and Farragut Sts., Davenport, $25,232—10,140 sq.yd. Locust Pl., 8th, 9th and 11th Aves., to Carey Constr. Co., Clinton, $21,638—Warrenite bitulithic paving 870 sq.yd. 9th Ave., to McCarthy Impvt. Co., Kahl Bldg., Davenport, $2,689—concrete paving 1,333 sq.yd. alley, to J. Peterson, Clinton, $2,717—4,420 ft. 12- to 24-in. vitr. clay sewers, Dists. 4 and 5, to Craig Constr. Co., Des Moines, $9,940—975 ft. 12 in. vitr. clay sewers in Dists. 6 and 7, to Clinton Eng. Co., Clinton, $1,473. Grand total $63,152.

Ia., Davenport—Scott Co., paving 1.006 mi. U. S. Hy. 61, to McCarthy Impvt. Co., Kahl Bldg., $29,812.

Ia., Dysart—For 7 in. rein.-con. paving 23,568 sq.yd., to Omaha Constr. Co., Omaha, Neb., $48,752.

Ia., Le Mars—Plymouth Co., grading 10 mi. roads, to G. W. Condon Co., 415 Farnum St., Omaha, Neb., $25,280—2 I-beam bridges, to Humphrey & Son, Cherokee, $6,300—32 culverts, to Christensen Bros., Tyler, Minn., $9,000. Grand total $40,580.

Ia., Sidney—Fremont Co. paving 16 mi. primary road, to Metz Constr. Co., Springfield, Neb., $363,032.

Kansas—State Hy. Dpt., Marion and Greensburg, grading, culverts 10,928 mi. roads in Barton Co., to Shuss & Anderson, Larned, $52,550—7.575 mi. Comanche Co., to E. W. Kolterman, 404 Securities Bldg., Omaha, Neb., $33,724—14.203 mi. Kiowa Co., to E. Graff, Newton, $57,542—2.01 mi. Sumner Co., to M. R. Amerman, 248 North Market St., Wichita, $29,692—8.181 mi. Marion Co., to Campbell Bros., 608 Manufacturers Exch. Bldg., Kansas City, $45,548—6.579 mi. Marion Co., to R. K. Walters, Marion, $40,919—5.299 mi. Cloud Co., to Campbell & Lachermaier, Miltonvale, $37,998. Grand total $312,176. Noted June 20.

Kansas—State Hy. Dpt., Osborne and Dodge City, to D. H. Hardman, Alton, sand graveling 10.019 mi. roads in Ellis Co., $29,094—to Throgmartin & Reis, Ft. Scott, 9.42 mi. Ford Co., $6,029—to Western Bridge & Constr. Co., 3807 Leavenworth St., Omaha, Neb., 12 mi. Hamilton Co., $5,880; 5.812 mi. Hodgeman Co., $1,917; 3 mi. Kearny Co., $1,860; 6 mi. Stanton Co., $3,231; 20 mi. Haskell Co., $24,000—to Yant Constr. Co., 905 Omaha Natl. Bank Bldg., Omaha, Neb., 18 mi. Scott Co., $7,524; 12 mi. Wichita Co., $3,528—to Geiger & Rutherford, Leavenworth, concrete paving 4.723 mi. Ford Co., $119,234; 0.682 mi. Doniphan Co., $22,164—to Young & Hall, Maywood, Neb., grading, culverts 2.995 mi. Norton Co., $23,767; 5.142 mi. Osborne Co., $25,440; 2.259 mi. Phillips Co., $13,748—to A. L. Cook, Ottawa, 5.655 mi. Smith Co., $37,870. Grand total $325,286. Noted June 13 and 20.

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Kansas—State Hy. Comn., Manhattan, grading, hedge, culverts 15.58 mi. roads in Riley Co., to D. Scherrer, 329 North 18th St., Kansas City, $112,417.

Kentucky—State Hy. Dept., Frankfort, traffic bound macadam paving using rein.-con. pipe 11.573 mi. road in Fleming Co., 16 ft., to Irvine Constr. Co., Irvine, Ky., $99,556—grading, using rein.-con. pipe 3.841 mi. road in Pike Co., 20 and 26 ft., to Campbell & Johnson Co., Pikeville, $61,960. Noted June 13.

La., Shreveport—Concrete paving Ashton St., to Flenniken Constr. Co., Shreveport, $24,321—Louisiana Ave. and Looney St., to Shreveport Paving Co., $1,050 and $15,056 respectively. Grand total $40,427.

Maryland — State Roads Comn., Baltimore, sheet asphalt paving 0.64 mi. Contr. BC-79, Baltimore Co., to Baltimore Asphalt Block & Tile Co., 1320 North Monroe St., Baltimore, $93,549. Noted June 20.

Maryland — State Roads Comn., Baltimore, graveling 3.3 mi. Contr. P-92, Prince George Co., to T. Mullan, 3945 Greenmount Ave., Baltimore, $32,711. Former contract rescinded. Noted July 4.

Massachusetts — Dpt. P. Wks., bituminous macadam paving 4,200 ft. Sherborn, to Frank & Frank Constr. Co., 9 Doyle Ave., Providence, R. I., $21,362—7,012 ft. Stoneham and Wakefield, to T. J. McCue & Son, 624 North Beacon St., Watertown, $50,243—1,500 ft. Saugus, to M. McDonough Co., Swampscott, $6,033 — gravel and bituminous macadam paving 4,100 ft. Brimfield, to A. G. Bianchi Constr. Co., 98 Lincoln Park, Longmeadow, $11,450—bitulithic concrete paving 8,100 ft. West Tisbury, and 700 ft. Yarmouth, to Washburn & Sheridan, East Taunton, $37,830. Grand total $126,918. Noted June 27.

Mass., Boston — For concrete walks in Boston Common, Boston Proper, to J. McCourt Co., 910 Huntington Ave., also Orchard Park, to Ferrari & Petaccia, 238 Bennington St., East Boston, est. $25,000; bitulithic paving Regis Rd., to A. A. R. Doyle, 44 Perkins St., Jamaica Plain, Leamington Rd., to J. C. Coleman & Sons Co., 1620 Tremont St., Roxbury; Blue Hill Ave., to A. G. Tomasello & Son, Inc., 250 Stuart St., Boston. Est. exceeds $25,000.

Mass., Lynn — Eastern Massachusetts Street Ry. Co., 38 Chauncy St., Boston, granite block paving 2,200 sq.yd. track area Fairfield St., to Appel & O'Toole, 78 Moreland St., Roxbury.

Mass., Westwood—Grading, surfacing Loring and Hooper Sts., to Hudson Constr. Co., Newport, R. I. Est. $25,000.

Mich., Dearborn—For 8 in. concrete paving 30,000 sq.yd. Assessment Dists. 283, 284 and 286, to Otis Cement Constr. Co., 2956 Penobscot Bldg., Detroit, $79,460.

Mich., Detroit—Concrete, stone curbing, 3½ in. sheet asphalt on 8 in. concrete paving 8 avenues, to Detroit Asphalt Paving Co., 909 Transportation Bldg., $131,523—Pierson Ave., to Cleveland Trinidad Paving Co., 715 Hammond Bldg., $11,518—Klinger and Fairmount Aves., to Mark R. Hanna Co., Ryan and Nevada Rds., $53,291. Grand total $196,332.

Minnesota—State Hy. Comn., St. Paul, grading 411,500 cu.yd. State Project 2-40, Sect. 2, F.A.P. 416-A, to McLaughlin & Lange, 2020 Dupont Ave. So., Minneapolis, $181,470. Noted June 13.

Minn., Duluth—C. Williams, city comr., one course rein.-con. on macadam, crushed rock paving 50,527 sq.yd. West Superior and Oneota Sts., to Thornton Bros., 1363 Dayton Ave., St. Paul, $145,608. Est. $145,618.

Minn., St. Paul—Sheet asphalt paving 16,383 sq.yd. Concord St., to Feyen Constr. Co., 277 Burgess St., $53,340. Noted June 6.

Mo., Joplin—Concrete paving 14,450 sq.yd. 4th St., to V. E. Koch, 417½ Joplin St., at $1.965 per sq.yd.—asphaltic concrete paving 1,460 sq.yd. Joplin St., and curbing, guttering 222 ft. Joplin St., to Granite Bituminous Paving Co., Ry. Exch. Bldg., St. Louis, $1.75 and $0.70, per ft. respectively.

Montana—State Hy. Comn., Helena, grading 322,948 cu.yd. Custer Co., to Stanley Bros. & Prahl & Sawtell, St. Cloud, Minn. $113,724—24.011 mi. Yellowstone and Musselshell Counties, to Lalonde Constr. Co., Bainville $98,557—13.872 mi. Phillips Co., to Winston Bros. and Montgomery & Son, Chinook $79,428—7.05 mi. Madison, Callatin and Jefferson Counties, to L. T. Lawler, Butte $62,2381—7.723 mi. Flathead and Glacier Counties, to A. R. Douglas, Kalispell $81,623—250,834 cu.yd. Dawson Co., to Stevens Bros., 612 Endicott Bldg., St. Paul, Minn. $69,269—grading 9.08 mi. Wheatland and Golden Valley Counties, also graveling 1.517 mi. Fergus Co., to T. A. Carr & Co., Winnett $33,731, and $13,349 respectively—graveling 7.939 mi. Lake Co., to O'Connor & Mitchell, Dillon $23,883—23.16 mi. Teton Co., to L. P. Thornquist, Great Falls $33,612—concrete bridges in Deer Lodge Co., to Coverdale & Eiman, Anaconda $6,163. Grand total $615,711.

Nebraska—State Dpt. P. Wks., State House, Lincoln, to L. G. Crownover, Lincoln, grading P. 138 A and C, $3,049; P. 28 and 138-D, $12,646; P. 635-A, $19,230—to Central Bridge & Constr. Co., Wahoo, P. 58-B, $3,153. Grand total $38,078. Noted June 20.

Neb., Omaha — Asphaltic concrete paving 4,536 sq.yd. Grant St., to John Kerns Constr. Co., 42nd and Izard Sts., $14,115—asphalt paving 13,848 sq.yd. Dodge St., to James J. Parks Co., 205 Bankers Savings Bldg., $56,917—8,465 sq.yd. Douglas St., to F. L. Busche, 4118 North 30th St., $36,505. Grand total $107,537.

Nevada—State Hy. Comn., Carson City, reconstructing 33.18 mi. roads Nye and Esmeralda Counties, to Isbell Constr. Co., Carson City, $32,507.

New Hampshire — State Hy. Dpt., Concord, 6 in. one course rein.-con. on 8 in. gravel paving 31,777 sq.yd. Daniel Webster Hy. in Plymouth, to Arborio Road Constr. Co., 525 Main St., Hartford, Conn., $135,428 est. $170,000; 11,591 sq.yd. same road in Boscawen, to W. H. Hinman, Medway, Mass., $45,995 est. $52,000. Noted July 4.

New Hampshire—State Hy. Dpt., Concord, 3 in. bituminous macadam on 8 in. broken stone surfacing 2.3 mi. Ocean Road, North Hampton, to Amos D. Bridges Sons, Inc., Hazardville, Conn., $34,767. Est. $39,000.

N. J., East Orange—City Council, City Hall, curbing, sheet asphalt on 6 in. concrete paving Arsdale and Sunnyside Terraces, to Standard Bithulithic Co., foot Brill St., Newark, $35,530. Est. $45,000.

N. J., Harrington Park—Bd. Boro Council, Boro Hall, improving Harriot Ave., to G. M. Brewster & Son, 253 West Fort Lee Rd., Bogota, sidewalks $0.20 per sq.ft., curbing 0.60 per lin.ft., paving $0.28 per sq.ft. Noted Apr. 18.

N. J., Linden—Common Council, City Hall, curbing, 8 in. rein.-con. wings on each side Elizabeth Ave., to L. DiFrancesco, 714 Central Ave., Westfield, $94,544.

N. J., May's Landing — Bd. Twp. Council, Township Hall, grading, paving, to E. W. Goehler, Pleasantville, $46,490.

N. J., Morristown — Bd. Freeholders Morris Co., Court House, paving 1.5 mi. Columbia Turnpike, 30 ft., to Weldon Contg. Co., Westfield, $181,910. Noted June 20.

N. J., New Brunswick — Bd. Freeholders Middlesex Co., Court House, concrete paving 2.58 mi. Amboy Ave., to Teriello & Purdy, Bogota, $280,846. Noted July 4.

N. J., Plainfield—City Council, City Hall, 7 in. bituminous macadam paving Kenyon Ave., to Terrible Constr. Co., 217 Emerson Ave., $32,780. Noted June 27.

N. J., Ridgefield—Bd. Boro Council, Boro Hall, grading, paving Oakdene Ave., to Bergen Contg. Co., Inc., 365 Lawton Ave., Cliffside, $23,373—Hamilton Ave., to R. J. Fox, Gorge Rd., Grantwood, $32,042. Noted July 4.

N. J., Somers Point—Bd. Boro Council, City Hall, repairing, ugite on gravel paving Delaware and Higbee Aves., to Wallace & Gilbert, Ocean City. Est. $25,000.

N. J., Somerville—Somerset Co., Court House, curbing, 9 in. rein.-con. paving Union Ave., to J. Kinzley Co., Zabriskie St., Hackensack, $56,465.

N. Y., Buffalo—G. Fisk, comr. Erie Co., repaving 6,521 ft. Woodland Ave. (except crossings at Robie and Florence Aves.) and 4,401 ft. Prospect Ave. (except Hampshire St. crossing), to Warren Bros. Roads Co., Rand Bldg., $28,227 and $19,498 respectively.

N. Y., Buffalo—G. Fisk, comr. P. Wks., Municipal Bldg., standard asphalt paving Leonard St., to H. P. Burgard, 1968 Fillmore Ave., $24,225—Mexican asphalt paving Eden Ave. and Dunlop St., to Standard Paving Co. Ltd., 945 Bailey Ave., $32,740 and $14,860 respectively—warrenite bitulithic repaving Prospect Ave. and Congress St., to Warren Bros. Road Co., 38 Charles River Rd., Cambridge, Mass., $26,600 and $82,275 respectively—Sweet and Norwood Aves., to Brayer Bros., 1515 William St., $21,291 and $57,109 respectively. Grand total $259,100. Noted Mar. 14 and Apr. 4.

N. Y., Lowville — Paving Park Ave. and Easton St., to L. Malone, Lake Placid.

N. Y., New York—Bd. Estimate & Apportionment, City Hall, paved street along easterly side Court House site between Duane and Pearl Sts., to Meehan Paving & Constr. Co., 90 West St., $17,945. Noted June 20.

N. Y., New York—H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., to Remo Eng. Corp., 645 East Tremont Ave., grading Logan Ave. $1,683; Crosby Ave. $10,839—to C. D. Beckwith, Seneca Ave. and Edgewater Rd., asphalt paving Allerton Ave., $48,903—to Gaffney Constr. Co., Zerega and Storey Aves., Huntspoint Ave., $22,435; Boone Ave., $7,843; Gleason Ave. $6,770—to Bronx Asphalt Co., Zerega Ave., and Westchester Creek, Gates Pl. $11,111. Grand total $109,584. Noted June 20.

Ohio—R. N. Waid, dir. hys., Columbus, concrete paving 2.629 mi. and 3.425 mi. Cuyahoga Co., to Ohio Eng. Co., Lorain, $243,077 and $319,240 respectively—1.93 mi. Columbiana Co., to McClain Constr. Co., Bellaire, $68,144—0.741 mi. Columbiana Co., to Lewis & Copeland, Lima, $23,419—3.982 mi. Erie Co., to G. B. Herring & Son, Mansfield, $104,517—5,931 mi. Jackson Co., to Brewer & Brewer, Chillicothe, $171,533—brick paving 1.985 mi. and 2.133 mi. Cuyahoga Co., to Highway Constr. Co., East 146th St., Cleveland, $223,532 and $274,466 respectively—1.488 mi. Fairfield Co., to Adams Bros. Co., Muskingum Ave., Zanesville, $44,727—brick, except brick paving 0.321 mi. Athens Co., to A. K. Grandle, Leesburg, $14,374—furnishing, delivering brick for same road to Ohio Dpt. P. Welfare, Columbus, $3,040—asphalt paving 0.94 mi. Belmont Co., to Federal Asphalt Paving Co., Hamilton, $22,078—grading, 3.96 mi. Carroll Co., to W. M. Gray Co., 408 Fairwood Ave., Columbus, $42,708—guard rails 0.07 mi. Erie Co., to R. J. Wager Co., Sandusky, $14,100—Hillside brick paving 1.185 mi.

Streets and Roads (Continued)

Geauga Co., to N. B. Putnam, Columbus, $52,-866—gravel paving 0.056 mi. Hocking Co., to Barthlow & Son, Logan, $11,071—Kentucky rock asphalt paving 1.581 mi. Monroe Co., to Dodge-Hussey, Inc., Columbus, $20,089—traffic bound macadam paving 0.69 mi. Muskingum Co., to E. L. Paul, Zanesville, $8,027—rein.-con. paving 0.17 mi. Summit Co., to W. A. Yeagle, Clyde, $13,632—sheet asphalt paving 1.263 mi. Union Co., to A. G. Pugh, 180 North High St., Columbus, $29,281—concrete approach slabs 0.316 mi. Washington Co., to McHugh Bros., $10,903. Grand total $1,-714,824. Noted June 20.

O., Cleveland—Grading, curbing, concrete paving 11,250 sq.yd. East 80th St., and grading, curbing, oil asphalt paving 820 sq.yd. East 130th St., to Enterprise Paving & Constr. Co., 8444 Bway., $44,774 and $5,593 respectively—9,230 sq.yd. Lena Ave., to E. McHugh, East 44th St. and Wheeling & Lake Erie R.R., $36,-972—grading, curbing, brick paving 2,370 sq. yd. West 28th St., to Loesch & Green Constr. Co., Ridge Rd., $11,287—3,610 sq.yd. Berwin Ave., to Cleveland Trinidad Paving Co., Western Reserve Bldg., $12,153—15,550 sq.yd. East 127th and West 140th Sts., to Highway Constr. Co., Terminal Tower, $80,475—34,100 sq.yd. 135th, 159th, 146th, 149th and 150th Sts., Grimsby, Sabinas and Walworth Aves. to Roehl Bros., 7002 Denison Ave., $163,069. Grand total $354,323.

O., New Philadelphia—Brick paving Maple St., to Griggs Anderson Co., Millersburg, $28,682. Est. $30,000.

Oklahoma—State Hy. Dpt., Oklahoma City, grading 5.665 mi. F.A.P. 202-C and 5.692 mi. Sect. D, Grady Co., to McKey & Hopper, Blanchard, $26,120 and $27,899, est. $26,120 and $30,000 respectively—7.202 mi. Payne Co., to J. J. Harrison, 2100 South High St., Oklahoma City, $43,235 est. $50,000—7.0775 mi. Payne Co., to R. R. Tway, 237 East 18th St., Oklahoma City, $24,800 est. $27,000—11.006 mi. Pittsburg Co., to Pharoah & Co., Henryetta, $43,991 est. $50,000. Grand total $166,045. Noted June 27.

Okla., Blackwell—Kay Co., grading, concrete paving 16,436 sq.yd. Kay City Rd. West, to Southwestern Constr. Co., Ponca City, at $2.24 per sq.yd.

Okla., Oklahoma City — Grading, paving Madison Ave., 24th, Eubanks, Edgemere and Court Sts., to Western Paving Co., Petroleum Bldg., $54,548. Est. $58,600.

Ore., Portland—Grading, curbing, paving Halsey St. between East 52nd and East 65th Sts., to Kern & Kibbie, Portland, $28,605.

Pennsylvania—State Hy. Comn., Harrisburg, rein.-con. paving 3,400 sq.yd. Washington Co., to Petriello Bros. $56,296—concrete paving 2,432 sq.yd. Indiana Co., to Farris Eng. Co., Pittsburgh $42,283—32,600 sq.yd. Clearfield Co., to Cooper Constr. Co., Clymer $202,778—30,800 sq.yd. Tioga Co., to Smouse & Kramer, Galeton, $153,870. Grand total $455,227. Noted June 6 and 13.

Pa., Phila.—Dpt. P. Wks., Bureau Hys., to T. P. Lee, 5629 Cherry St., grading Eastwick St., $8,225; Eastwick, 56th, 57th Sts., $4,346—to J. Herzog, 4314 Old York Rd., Temple St., $1,515—to Union Paving Co., 123 South 2nd St., asphalt paving (assessment work) Boyer St., $3,499; Hegerman St., $7,149; Wanamaker So., $4,498; asphalt repaving (heater method) Group 2, $73,896; sheet asphalt paving Walnut Street Bridge over Schuylkill River, $3,099—to Municipal Constr. Co., Washington Square Bldg., asaphalt paving (assessment work) Locust St., $7,489 smooth dressed and redressed granite block repaving 11 intersections, $31,815—to Eastern Asphalt Co., Penn Bldg., asphalt repaving (heater method) Group 1, $45,482 — to Barber Asphalt Co., Hunting Park Ave. at E St., Group 3, $48,252—to Mazzola & Marano, 739 South 7th St., redressed granite block repaving Franklin St., $22,504—to Elkins Paving & Constr. Co., 834 North Holly St., 4th St. $37,109—to Atlas Paving Co., 317 South 6th St., 9th St., $6,071—to J. Salvucci, 512 North 65th St., 17th St., $32,582. Grand total $338,132.

Tenn., Greenfield—Curbing, guttering paving, to V. E. Schevenell, Memphis, 6 in. concrete $152,511, or asphalt $166,011.

Tenn., Knoxville — City, grading, curbing, guttering, sewers, paving, to Murray Constr. Co., Sprankle Bldg., Knoxville, $227,195. Noted July 4.

Texas—G. Gilchrist, state hy. engr., Austin, double bituminous paving 12.5 mi. Brazos Co., to Haden & Austin, 328 Post Dispatch Bldg.; Houston, $27,178—15.3 mi. Ellis Co., to McClung Constr. Co., 1309 Ft. Worth Natl. Bank Bldg., Ft. Worth, $31,644—grading, concrete paving 6.497 mi. Dallas Co., to J. P. Foty, Ft. Worth, $379,318—1.726 mi. El Paso Co., to El Paso Bituulithic Co., El Paso, $108,783—grading, bituminous filled brick on concrete paving 1.167 mi. Tarrant Co., to Thurber Constr. Co., 1811 Ft. Worth Natl. Bank Bldg., Ft. Worth, $172,391—2 course limestone rock asphalt on crushed stone paving 17.57 mi. Uvalde Co., to Dexter Constr. Co., Hanger No. 11 Love Field, Dallas, $247,246—single bituminous on 3 in. quarry run limestone paving 10 mi. Wharton Co., to Brown & Root, P. O. Box 745, Austin, $50,427—grading 7.835 mi. San Patricio Co., to Cage & Ruby, Bishop, $26,-793—4.257 mi. Waller Co., to T. M. Morey, Houston, $21,438—11.013 mi. Henderson Co., to J. S. Moore & Sons, Lufkin, $184,496—7.361 mi. Cherokee Co., to E. G. Cowell, Plain Dealing, La., $100,600—7.379 mi. Ellis and Dallas Counties, to R. B. Stroup, Seymour, $59,529—grading, concrete paving 23.453 mi. Grayson Co., to S. & H. Constr. Co., 92 Mason St., Milwaukee, Wis., $533,709—concrete paving 8.870 mi. Tarrant Co., to General Constr. Co., 414 Cappa Bldg., Ft. Worth, $188,272—13.181 mi. Knox Co., to H. L. Canady Co., Dallas, $308,-359—8.834 mi. Matagorda Co., to R. W. Briggs & Co., Pharr, $202,475. Grand total $2,642,-658. Noted June 13 and 20.

Tex., Dallas—Improving 6 mi. Sect. 1 Pleasant Valley Rd., to C. A. and J. W. Vilbig, Paris St., $107,577.

Tex., La Grange—Concrete paving 26,800 sq.yd., to Foty & Gaylord, Houston, $54,453. Noted June 20.

Wash., Chehalis—Comrs. Grays Harbor Co., improving Ocean View Hy. north from Copalis, to C. D. Olson & Co., Chehalis, $34,490. Est. $40,000.

Wash., Everett—City Comn., concrete repaving Heron St. between F and L Sts., to F. A. Keasal, Everett, $34,969. Est. $40,000.

Wash., Seattle—Bd. P. Wks., paving 29,350 sq.yd. Carleton Ave., to J. B. Covello, 1510 Sturges Ave. S., $77,926.

Wash., Seattle—Comrs. King Co., graveling 3.27 mi. Redmond-Bellevue Rd., to L. J. Dowell, Inc., Securities Bldg., $36,890; 2.9 mi. Lake Sammamish Shore Line Rd., to Northwest Constr. Co., Seattle, $68,900, est. $83,000.

West Virginia—State Rd. Comn., Charleston, grading, concrete paving Barbour Co., to Fuccy Bros., Weston, $13,980—Boone Co., to Fulton, Stollings & Ballard, Madison, $51,-327—Brooke Co., to Boso & Ritchie, Ravenswood, $150,768—Cabell Co., to R. L. Black & Co., Milton, $59,138—Clay Co., to Markle, Coleman, Smith & Young, Clay, $42,158—Harrison Co., to Ferguson Bros., Shinnston, $23,240—Jefferson and Mineral Counties, to R. W. Moore, & Co. Staunton, $18,819 and $120,594 respectively—Logan Co., to Hatfield Constr. Co., 722 14th St., Huntington, $357,-867—Logan and Lincoln Counties, to R. B. Tyler Co., 1446 Levering St., Louisville, Ky., $77,200—Mason and Putnam Counties, to Huntington Gravel & Supply Co., 20th St. and 2nd Ave., Huntington, $35,000 and $51,050 respectively—Ritchie Co., to Salem Constr. Co., Salem, $14,920—Ritchie Co., to C. V. Roctor & O. L. Metals, Spencer, $103,422—Roane Co., to F. C. Horn, Madison, $46,641—Tylor Co., to Phillips & Withers, Buckhannon, $58,847—Wetzel Co., to Triangle Trucking Co., Parkersburg, $51,760—Wyoming Co., to Pinnell & Pfost, Ripley, $74,382. Grand total $1,351,113. Rejected bids Project 3391, Roane Co. Noted June 13.

Wisconsin — State and Richland Co. Hy. Comns., Court House, Richland Center, grading 12.15 mi. S.P. 9284, to Nelson, Mullen & Nelson, Inc., 355 Temple Court, Minneapolis, Minn. $46,220—concrete structures on above road, to Guaranty Constr. Co., Minneapolis, Minn. $50,000—crushed graveling same road, to J. S. Karlslyst, Stoughton, $29,216. Grand total $125,436.

Wis., Milwaukee—Dpt. P. Wks., R. E. Stoelting comr., paving 4 alleys, to Parkinson Constr. Co., 322 27th St., $32,155.

Wis., Milwaukee—Dpt. P. Wks., R. E. Stoelting, comr., to J. C. Bluhm & Son, 1299 Achilles Ave., paving 2 alleys $3,891—to Schwerm Bros., 1703 Well St., 1 alley $2,867—to Parkinson Constr. Co., 322 27th St., 1 alley $3,210—to Messenger Constr. Co., 5107 North Ave., 1 alley $1,511; Oeflein Ave. $1,035; 32nd St. $204—to Czerwinski Constr. Co., 816 Clinton St., 68th St. $25,712; Pond du Lac Ave. $74,-589—to Lincoln Constr. Co., 1487 13th Ave., 19th Ave. $3,696—to Badger Constr. Co., 97 East Wisconsin Ave., East Ohio Ave. $11,379; Taylor Ave. $17,075—to G. W. Hirth, Inc., 719 Chambers St., walks at 738 Forest Home Ave. $1,756; 185 Reed St. $7,799. Grand total $155,935.

Wyoming—State Hy. Comn., Cheyenne, grading 11.49 mi. Sheridan Co., to J. Davis, Wheatland $49,252—11.056 mi. Washakie Co., to R. A. Schwieger, Sheridan $40,053—grading 3.176 mi. F.A.P. 87-B, Fremont Co., to Sherrock-Powell, Casper $24,219—steel, and bronze plates, remodeling, painting Wind River Bridge on same road, to J. F. Turpen, Wheatland $28,839 and $35,564 respectively. Grand total $177,927.

B. C., Abbottsford—Minister P. Wks., Victoria, grading, culverts, 2 mi. Yale Rd., to King & Moncreet Constr. Co., 207 Hastings St. W., Vancouver, $46,279. This corrects report in July 11 issue.

Ont., Belleville—Curbing, concrete guttering, asphalt paving 12,000 sq.yd. Dundas St., to Standard Paving Co., Central Chambers, Ottawa, $43,284. Est. $45,000. Noted May 23.

Ont., Cobourg—E. L. MacNachtan, clk. Northumberland and Durham Counties, County Bldg., asphaltic concrete paving 2¼ mi. Ontario and Division Sts., to Warren Bituminous Paving Co., 54 University Ave., Toronto, $69,000. Est. $70,000. Noted May 16.

Ont., Walkerville—Town Council, to Caldwell Sand & Gravel Co., 228 Sandwich St., Windsor, concrete, asphalt paving Turner Rd. $17,631; 2 alleys $11,390; Lens Ave. $6,674; Byng Ave. $8,026, Arras Ave. $5,878; Amiens Ave. $5,827; Mohawk Ave. $8,804—to Merlo, Merlo & Ray, Ltd., Sandwich St., East Windsor, Durham Pl. $20,971; Tecumseh Rd. $28,633. Grand total $113,933.

Public Bond Elections

Coming Bond Elections

Waterworks—Riverside, Calif., Property Owners Romoland Dist., $600,000.
Sewers—Rocky River, O., $90,000.
Sewers—Texhoma, Okla., July 30, $58,400.
Sewer—Hooker, Okla., $25,000.
Waste Disposal—Little Rock, Ark., Aug. 19, $115,000.
Bridges—Godfrey, Ill., $20,000.
Airport—Little Rock, Ark., Aug. 19, $200,000.
Airport—Little Rock, Ark., Aug. 20, $35,000.
Court House — Beaumont, Tex., Aug. 3, $1,-000,000.
Auditorium—Little Rock, Ark., $900,000.
Civic Center—Little Rock, Ark., $400,000.
Park Development — Little Rock, Ark., $350,000.
Street Cleaning Equipment—Little Rock, Ark., Election Aug. 19, $300,000.

Bonds Voted

Waterworks—Coleman, Tex., $40,000.
Waterworks—Britton, Okla., $38,300.
Sewers—Fairport, N. Y., $77,500.
Sewers—Britton, Okla., $25,000.
Airport—Fort Worth, Tex., $500,000.
Fire Hall—Fort Worth, Tex., $500,000.

Buildings—Industrial

Proposed Work

Ala., Birmingham — FACTORY — Lamson & Sessions, 2188 Scranton Rd., Cleveland, O., soon let contract 4 story, basement factory, in North Birmingham, $200,000. George S. Rider Co., Century Bldg., Cleveland, O., archt. Noted May 23.

Ala., Montevello—COTTON MILL—Montevello Cotton Mills, 1 story, basement, 100 x 350 ft., concrete, brick, cast iron, steel mill, Robert & Co., Bona Allen Bldg., Atlanta, Ga., engrs. Noted June 20.

Conn., Hartford—MANUFACTURING PLANT—C. Maimfeldt, archt., 15 Lewis St., soon lets contract 2 story, 50 x 100 ft., brick, rein.-con., plain found., Bartholomew St., for Liner-Atwill Co., 69 Bartholomew Ave. $65,000.

Conn., Hartford—PLANT—Terry Steam Turbine Co., Windsor Ave., plans by Westcott & Mapes, Inc., 139 Orange St., New Haven, brick, steel boiler plant, $40,000 or more.

Ill., East St. Louis—FACTORY—See "St. Louis, Mo."

Ky., Louisville—FACTORY—Reynolds Metal Co., 30th St. and Grand Ave., plans by O. P. Ward, Lincoln Bldg., 2 story, 90 x 100 ft., Hale St., $60,000; (1st unit) 1 story, 140 x 216 ft., on 12 acre site, Camp Ground Rd.

Mass., Braintree — SERVICE and REPAIR GARAGE—P. Wynot, Commercial St., plans by L. S. Joslin, 339 Newbury St., Boston, steel, concrete, plain found., Commercial St. $40,000.

Mass., Middleboro—FACTORY—Maxium Fire Engine Co., C. L. Maxium, pres., 3 and 4 story, brick addition, plain found. $140,000 or more. Private plans.

Mass., West Springfield (br. Springfield)—SHOP—Boston & Albany R.R. Co., G. A. Kirley, ch. engr., Boston, brick, steel addition, $500,000.

Mich., Detroit—FACTORY—Detroit Butcher Supply Co., 1455 Gratiot Ave., plans by Pollmar & Ropes, Hoffman Bldg., 2 story, brick, steel, rein.-con., plain found., Bellevue Ave. $50,000.

Mich., Detroit — FACTORY — Detroit Steel Products Co., 2255 East Grand Blvd., plans by Smith, Hinchman & Grylls, 800 Marquette Bldg. (1st unit) 1 story, 200 x 700 ft., brick, steel, rein.-con., Mt. Elliott Ave. $400,000.

Mo., St. Louis—FACTORY—Gardner Motor Co., Main and Rutger Sts., St. Louis, Mo., and Parks Aircraft Mfg. Co., East St. Louis, Ill., expending $2,500,000, addition to plants, here, and East St. Louis, Ill.

N. J., Newton—MILL—Mazuy Mills, W. W. Woodward, pres., Mill St., sketches 2 story, basement, brick, steel, plain found., Mill St. $40,000. Noted May 30.

N. Y., Astoria—SERVICE GARAGE—J. Goldberg plans by Cohn Bros., 363 Stone Ave., service garage, Goodrich St. and Astoria Ave. $40,000.

N. Y., Boonville—SERVICE GARAGE—F. Zeigler, 40 car stucco, steel service garage.

N. Y., Brooklyn — FACTORY — Savoia Macaroni Mfg. Co., 63rd St. and 15th Ave., bids after Aug. 1, general contract altering 3 story, brick, 63rd St. and 15th Ave. $100,000. F. Savignano, 6005 14th Ave., archt. Noted July 11.

N. Y., Brooklyn — SHOP, STORAGE and GARAGE — Brooklyn Boro Gas Co., Mermaid Ave. and West 17th St., bids after Aug. 10, general contract 157 x 197 ft., brick, concrete, Nostrand Ave. and Shell Rd. $300,000. Block & Hess, 18 East 41st St., New York, archts. Noted May 30.

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Buildings—Industrial (Continued)

N. Y., College Point—FACTORY—Aero Supply Corp., plans by P. Coco, 433 Steinway Ave., 1 story, 50 x 137 ft., 22nd St. and 3rd Ave. $40,000.

N. Y., New York — AUTO LAUNDRY, SERVICE STATION and GARAGE — McSim Realty Corp., R. Simberg, pres., 1133 Bway., plans by A. J. Simberg, 1133 Bway., concrete auto laundry, service station and garage, Boston Rd. and 170th St. $40,000.

O., Scienceville — FACTORY — Youngstown Radio, Lamp & Novelty Co., 1 story, brick, off McGuffy Rd. $40,000.

Oklahoma — COTTON MILL and COTTON GINS—Farmers Gin Co., Sayre, sketches cotton oil mill, Sayre, $40,000; 2 cotton gins, one at Jet, other at Goteba, $25,000 each. Private plans.

Okla., Oklahoma City—CASINGHEAD GASOLINE PLANT—Coline Oil Co., Trades Natl. Bank Bldg., 2 unit plant at oil field south of city. $50,000. Private plans.

Pa., Lock Haven—PLANT—Analine Products Co., 45 East 17th St., New York, 3 story addition. $200,000. Private plans.

Pa., Phila.—PLANT—I. Fischman & Son, 10th and Allegheny Sts., plans by C. E. Wunder 1520 Locust St., 1 and 2 story, 375 x 480 ft., brick, steel, plain found., Erie and F Sts. $1,500,000.

Tex., Brownsville—AIRPLANE SHOP—Pan American Airways, Inc., c/o G. L. Reil, vice pres., 120 x 120 ft., steel, concrete addition to airplane shop, El Jardin addition. E. L. Odell, Brownsville, ch. engr.

Tex., Mercedes—ICE PLANT—R. W. Alford, 120 Craig St., San Antonio, 1 story, 50 ton capacity, brick, rein.-con. $50,000.

Va., Norfolk — WAREHOUSE — Norfolk & Western Ry. Co., F. L. Nicholson, ch. engr., Norfolk, 2 warehouses adjoining merchandise piers at Lamberts Point. $250,000.

N. B., St. John—MILL—Maritime Corn Meal Co., 30 Haniver St. new mill. $125,000.

Ont., Barrie—PACKING PLANT—First Cooperative Packers of Ontario, 2 or 3 story, basement, brick, steel, concrete. $200,000. Engineer and architect not selected. Noted Feb. 21.

Ont., Belleville—POWER LAUNDRY—Consolidated Laundries Ltd., 5350 des Carneres St., Montreal, laundry. $75,000.

Ont., Delphi—GRADING STATION—Imperial Tobacco Co. of Canada, 3810 Antoine St., Montreal, Que., 1 and 2 story, brick, concrete grading station for tobacco. $150,000. Private plans.

Ont., Hanover—FACTORY—Peppler Bros. 2 story, 50 x 90 ft., rein.-con. addition. Main St. $60,000. Private plans.

Ont., Oshawa—AUTO BUMPER FACTORY—Skinner Co. Ltd., Gananoque, plans by R. H. Bishop, Roger Miller Bldg., Toronto, 1 story, 100 x 400 ft., brick, steel, concrete, plain found., Simcoe St. S. $160,000. Noted June 20.

Ont., St. Catharines — FACTORY — Bakelite Corp., 247 Park Ave., New York, factory. $90,000. Maturity 1930.

Ont., Toronto—SUB-STATION—Toronto Hydro-Electric System, 225 Yonge St., 2 story, brick, steel, concrete found., John St. $210,000. Private plans.

Que., Milnikek—MILL—Matapedia Lumber Co. Ltd. mill. $75,000.

Bids Asked

Conn., Bridgeport—POWER PLANT—United Illuminating Co., 1115 Broad St., F. Cutts, mgr., receiving bids (selected list of bidders), 3 story, 80 x 150 ft., brick, steel, concrete addition to turbine and switch room. $350,000. Westcott & Mapes, 139 Orange St., New Haven, archts. Noted Mar. 7.

Conn., Hartford—LAUNDRY—New England Laundry Co., 215 Hawthorne St., taking bids 1 and 2 story, brick, Homestead Ave. $40,000. Buck & Sheldon, Inc., 60 Prospect St., archts.

Ind., Indianapolis—FACTORY—July 20, by U. S. Fiber Box Co., 1315 Martindale Ave., brick, rein.-con., 103,000 sq.ft. floor space, $200,000. C. E. Bacon, 605 Odd Fellows Bldg., archts. Noted June 27.

Ia., Burlington—FACTORY—See "Contracts Awarded."

Mass., Boston—SERVICE GARAGE, etc.—Owner, c/o E. B. Stratton, archt., 25 Arch St., taking bids 2 story and service garage buildings, one 2 story, basement, 80 x 110 ft., 1309-11 Boylston St., other 1 story, basement, 35 x 110 ft., 1315 Boylston St., both concrete, brick, steel, plain founds.

Mass., Chelsea (br. Boston)—FACTORY—Owner, c/o Schein & Levine, archts., 333 Washington St., Boston, taking bids 2 story, brick addition, plain found. $40,000.

Mass., Holyoke—PRINTING PLANT—July 20, by Transcript Publishing Co., 180 High St., 2 story, basement 50 x 80 ft., brick, steel publishing plant. $75,000. Lockwood Green Eng., Inc., 100 East 42nd St., New York, archts.

Mich., Grand Rapids—BAKERY—Miner Pie Co., 645 1st St. N. W., taking bids 1 story, part basement, 90 x 119 ft., Butterworth St. To exceed $50,000. F. P. Allen & Sons, Hauseman Bldg., archts.

N. J., Jersey City—See "Contracts Awarded."

N. J., Jersey City—FACTORY—Owner, c/o P. Simeone, archt., 22 Journal Sq., bids about Aug. 1, general contract 3 story, basement, 100 x 100 ft., brick, steel, rein.-con., plain found. $75,000. Noted July 11.

N. J., Linden—FACTORY—A. J. Silberstein, arch., 60 Park Pl., Newark, taking bids general contract 3 story, basement, brick, steel, plain found., Elizabeth Ave., for Elizabeth Avenue Holding Co., c/o architect. Noted June 27.

N. J., Newark—BAKERY—M. N. Shoemaker, archt., 15 Central Ave., taking bids general contract 1 story, basement, brick, steel addition, plain found., Abington Ave., for Dugan Bros., Inc., 161 Abington Ave. $40,000.

N. J., Newark — FACTORY and SHOWROOM — E. C. Epple, assoc. archt., 44 Commerce St., bids about Aug. 1, 3 story, basement, brick, steel, rein.-con., plain found., Central Ave., from 16th to 17th Sts., for Packard Motor Car Co., Bway. and 61st St., New York. $300,000. A. Jahn, 1000 Marquette Bldg., Detroit, Mich., archt. Noted July 4.

N. J., Roselle—FACTORY—J. Drittel, 1107 Chandler Ave., taking bids 2 story, basement, 50 x 125 ft., brick, steel, plain found., 1107 Chandler Ave., $40,000. J. Anderson, 251 North Broad St., Elizabeth, archt. Noted July 11.

N. Y., Brooklyn—SERVICE GARAGE—See "Contracts Awarded."

O., Akron — FACTORY — Mohawk Rubber Co., S. S. Miller, pres. and genl. mgr., taking bids 3 story, basement, 75 x 100 ft., brick, steel, $125,000. Henry & Murphy, 2nd Natl. Bldg., archts.

Pa., Phila. — SHOP — C. E. Oelschlager, archt., 1615 Walnut St., taking bids 2 story, 50 x150 ft., brick, 232 Vine St., for Schuch Machine Co., 235 New St.

R. I., Slatersville—BOILER PLANT—Slatersville Finishing Co., Slatersville, taking bids 1 story, 55 x 85 ft., brick, steel, plain found. To exceed $40,000. C. T. Main, Inc., 201 Devonshire St., Boston, engrs.

Contracts Awarded

Calif., Los Angeles—FACTORY—Bates Valve Paper Bag Co., 2001 East 57th St., 1 story, 160 x 360 ft., brick, steel, Medford Ave., to Austin Co. of California, 777 East Washington St.

Calif., Richvale—PAPER FACTORY—Pacific Coast Pulp & Paper Co., plant addition, to C. S. Mabry Co., 4th and J Sts., Sacramento. $400,000.

Conn., Bristol—BOILER HOUSE, etc.—Lockwood Greene Engineers, Inc., 24 Federal St., Boston, Mass., new boiler house for heating forge plant, incl. two 600 hp. high pressure boilers, incinerating plant, 225 ft. radial brick stack, 3,000 ft. switch track, new steel tanks for oil storage, pipe tunnel from tanks to forge shop yard, to Aberthaw Co., 80 Federal St., Boston, Mass., for New Departure Mfg. Co., Bristol. Noted June 13.

Ill., Centralia—SHOE FACTORY—Johansen Bros. Shoe Co., 3640 Laclede Ave., St. Louis, Mo., 3 story, basement, 45 x 200 ft., and 57 x 62 x 91 ft., brick, rein.-con., to G. E. Tillman Constr. Co., City Natl. Bank Bldg. Est. $80,000. Noted May 9.

Ind., Elwood—FACTORY—Elwood Box Factory, general contract, brick, steel, rein.-con., to Faulstich & Faulstich, Elwood. Est. $46,000.

Ind., Ft. Wayne — MACHINE SHOP and SERVICE—Fisher Bros. Paper Co., 70 x 150 ft., brick, steel, to W. A. Sheets Constr. Co., 332 Utility Bldg. Est. $65,000. Noted Apr. 25.

Ind., Ft. Wayne—SERVICE and GARAGE—Kunkle Valve Co., 2 story, 60 x 150 ft., brick, steel, Washington and Clay Sts., to Bueshing & Hagerman Co., 402 East Superior St. Est. $50,000.

Ind., Greensburg—POWER HOUSE—Odd Fellows Home, brick, rein.-con., to Moir & Davis, Westport. Est. $150,000. Noted June 20.

Ind., Kokomo—SERVICE STATION—Western Oil Co., 310 North Meridian St., Indianapolis, brick, steel, to E. S. Moore, Kokomo. Est. $42,000. Noted June 20.

Ind., Muncie—FACTORY—Warner Gear Co., 1 story, 150 x 400 ft., brick, steel, Seymour St., to A. J. Glaser, 610 Jefferson St. Est. $75,000.

Ia., Burlington — FACTORY — Burlington Basket Co., E. A. Florang, pres., 2 story, basement, concrete, brick, 150,000 sq.ft. floor space, day labor under supervision F. Schroeder of Management Service Co., archts., 110 South Dearborn St., Chicago, Ill. $100,000.

Kan., Emporia — SHOPS, etc. — Atchison, Topeka & Santa Fe R.R. Co., H. W. Wagner, ch. engr. (Eastern Lines), 1 story, 24 x 77 ft., shop, 2 story, 28 x 52 ft. office, two 1 story, 15 x 34 ft. lavatories, 1 story, 24 x 74 ft. garage, 1 story, 16 x 108 ft. inspectors building, 1 story, 10 x 12 ft. gas storage, to Lundgren & Carlson, 213 Jackson St., Topeka. Est. $150,000.

Mass., Dorchester (sta. Boston)—LAUNDRY PLANT. BOILER HOUSE — White Cross Laundry Co., 15 Barnes St., 2 story, 70 x 115 ft., brick, steel, laundry plant, boiler house, plain found., to Austin Co., Jefferson Bldg., Phila., Pa. Est. $40,000.

Mass., Fairhaven — FOUNDRY — Fairhaven Iron Fdry., 2 Water St., rebuilding 1 and 2 story, 50 x 100 ft., brick, steel, plain found., to Macomber Steel Co., 1925 10th St. N.E., Canton, O. Est. $40,000. Noted May 30.

Mass., Gloucester—FACTORY—F. E. Davis Fish Co., Rogers St., altering, 1 story, basement, 75 x 95 ft., brick, rein.-con. addition, plain found., to W. M. Bailey Co., 88 Broad St., Boston. Est. $40,000 or more. Noted July 11.

Miss., Jackson—AUTO SERVICE STATION—Watkins, Watkins & Eager, 2 story, brick, steel, rein.-con., to W. G. Wetmore Constr., Co., Jackson. Est. $100,000.

Miss., Jackson—STORAGE BARN and OFFICE—Mississippi Power & Light Co., 110 x 113 ft., rein.-con., brick, steel, Commerce St., to Currie & Corley, Raleigh. Est. $40,000.

Mo., St. Louis—BOILER HOUSE—Manninckrodt Chemical Wks., 3600 North 2nd St., 1 story, basement, rein.-con., brick, to Woerman Constr. Co., Syndicate Trust Bldg. Est. $75,000.

Mont., Great Falls — CHEVROLET PARTS DEPOT—Argonaut Realty Co., H. T. Hickey, General Motors Bldg., Detroit, Mich., general contract 1 and 2 story, 127 x 190 ft., rein.-con., brick, steel, south side Whittier Park, to H. C. Struchen Co., 655 Shubert Bldg., St. Paul, Minn. Est. $150,000.

N. J., Jersey City—FACTORY—P. Fortugna, 377 Grand St., 1 story, basement, 50 x 165 ft., rein.-con., brick, steel, plain found., 53-55 Gilchrist St., separate contracts, $40,000. E. M. Annitto, 310 Duncan Ave., archt.

N. J., Newark—LAUNDRY—American Steam Laundry, 381 South 7th St., general contract 3 story, basement, 50 x 125 ft., brick, steel, plain found., South 7th St., to Enstee Bros., 111 Academy St. Est. $40,000.

N. J., Sayreville—POWDER PLANT and OFFICE—Hercules Powder Co., Parlin, general contract 2 story, basement, brick, steel, plain found., Parlen Sect., to Rogers & Sons Constr. Co., 71 John St., New Brunswick. Est. $40,000. Noted May 23.

N. Y., Brooklyn—NEWSPAPER PLANT and PRINTING PLANT — Brooklyn Daily Eagle, Eagle Bldg., addition, Johnson and Adams Sts., to W. Kennedy Co., 215 Montague St. Est. $1,000,000.

N. Y., Brooklyn—SERVICE GARAGE—J. S. Constr. Co., 133 Floyd St., 1 story, 100 x 200 ft., brick, concrete, Union and East 98th Sts., day labor, $40,000. Maturity in November. Noted May 16.

N. Y., Menands (mail Albany)—PRINTING PLANT—J. B. Lyons Publishing Co., Lyon Blk., Albany, 4 story, on 400 x 790 ft site, to Turner Constr. Co., 420 Lexington Ave. Est. $1,250,000. Noted Feb. 28.

N. Y., New York—PRINTING PLANT—Daily Mirror, Inc., 235 45th St., altering 16 story office store and loft building into printing plant, to J. H. Taylor Constr. Co., 31 Union Sq. Est. $100,000. Noted July 11.

O., Cleveland—FACTORY—Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., 1 story, 150 x 180 ft., brick, steel, concrete, to I. L. Huhting Co., Guarantee Title Bldg. Est. $100,000.

Okla., Oklahoma City—FACTORY—Prest-O-Lite Co., 30 East 42nd St., New York, 58 x 60 x 131 ft. factory, to C. B. Huffman, Oklahoma City. Est. $125,000.

Ore., Linnton — SAW MILL — Clark-Wilson Lumber Co., Linnton St., Portland, saw mill, incl. dock, machinery, on Willamette River. $40,000. Owner builds.

Pa., Norristown—FACTORY, WAREHOUSE, OFFICE—Norristown Magnesia & Asbestos Co., Ford and Washington Sts., 1 story, 96 x 360 ft., two 32 x 46 ft. wings, brick, steel, plain found., to F. R. Heavner, Norristown. Est. $50,000.

Pa., Pittsburgh—BOX FACTORY—Keystone Box Co., 28th and Smallman Sts., 3 story, 50 x 100 ft., brick, steel addition, to Cuthbert Bros. Co., Bessemer Bldg. Noted June 20.

R. I., Cranston (mail Providence)—FACTORY—Leonard Rooke & Co., 486 Broad St., Providence, 1 story, 60 x 100 ft., brick, timber, to O. D. Purington & Co., 605 Industrial Trust Bldg., Providence, est $40,000. Noted June 27.

Tenn., Columbia—MILL and OFFICE—Cadet Knitting Mills, 2nd St. and Allegheny Ave., two 2 story, basement, 100 x 400 ft. mills, 1 office building, rein.-con., brick, steel, to T. C. Thompson & Co., 609 North Smith St., Charlotte, N. C.

Wis., Milwaukee—BOX FACTORY—Eschweiler & Eschweiler, archts., 210 Mason St., 1 story, 60 x 122 ft., brick, timber, to W. W. Oeflein, 120 Wisconsin St., for Downing Box Co., 1702 3rd St. Noted July 4.

Wis., Milwaukee—FACTORY—Unit Corp. of America, 53rd Ave. and Burnham St., 1 story, 100 x 223 ft., brick, steel, plain found., 53rd Ave. to Klug & Smith, 69 East Wisconsin St.

Wis., Milwaukee — FACTORY — Wrought Washer Co., 46-54 South Bay St., 2 story, 75 x 140 ft., brick, steel, plain found., South Bay St., to Meredith Bros., 253 Washington St.

Ont., Chippewa—FACTORY—Canadian Ohio Brass Co., 1 story, brick, tile addition, concrete found., to Smith Bros., 1740 Ellen Ave., Niagara Falls. Est. $75,000.

Ont., Merritton—FACTORY—Hayes Wheel & Forgings, Merritton, W. Kisler, Mgr., 2 story, 100 x 85 ft., brick, concrete addition, Thorold Rd., to E. P. Muntz, Temple Bldg., Toronto. Est. $100,000.

Ont., Niagara Falls — FACTORY — Lionite Abrasive Ltd., 1 story, basement, 85 x 360 ft., brick, steel, Stanley St. $150,000. Owner builds. Private plans.

Buildings—Residential

Bids Asked

Mass., Brookline—See "Contracts Awarded."

Mass., Dorchester (sta. Boston)—"See Contracts Awarded."

Mass., Lawrence—A. O'Brien, Commonwealth Hotel, taking bids altering 6 story, basement hotel, 572 Essex St. $150,000 or more. H. Petzold, Bay State Bldg., archt.

Mass., Medford—Owner, c/o M. Louis, archt., 73 Cornhill, Boston, taking bids 5 story, basement, 90 x 125 ft., brick, concrete, steel, plain found., Playstead Rd. To exceed $150,000.

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Buildings—Residential (Continued)

Mich., Ecorse—July 23, by I. Morris, village clk., 2 story, basement, rein.-con., brick, steel, plain found., High and Cicotte Sts. $150,000. J. G. Kastler, 523 Detroit Savings Bank Bldg., Detroit, archt.

Mo., Kansas City—See "Contracts Awarded."

N. J., Asbury Park — C. B. Cook, archt., Asbury Park Trust Bldg., bids about Aug. 1, general contract altering and constructing 4 story, basement, brick, steel hotel addition, plain found., Cookman Ave., for Logan Hotel, Cookman Ave. $150,000. Noted Apr. 11.

N. J., Atlantic City — July 23, McIlvaine & Roberts, archts., Otis Bldg., Phila., Pa., 24 story, basement, 138 x 200 ft., rein.-con., brick, steel, Park Pl.

N. J., East Orange—See "Contracts Awarded."

N. J., Englewood—E. Erickson, c/o Kelly & Cowan, archts., 921 Bergenline Ave., bids about Aug. 15, general contract 9 story, basement, 85 x 100 ft., brick, steel hotel, plain found., Dean St. $500,000. Noted Apr. 18.

N. J., Jersey City—See "Contracts Awarded."

N. J., Jersey City — Burstyn Hiftler Corp., 404 38th St., Union City, bids about Sept. 1, general contract 5 story, basement, 70 x 100 ft., brick, steel, plain found., Academy St. $250,000. C. Shilowitz, 26 Journal Sq., archt. Noted June 13.

N. J., Jersey City—D. and S. Constr. Co., Inc., D. Clott, pres., 11 Van Houten Ave., 5 story, basement, 75 x 115 ft., brick, steel, plain found., 34 Duncan Ave., separate contracts. $175,000. M. Kraut, 3010 Hudson Blvd., archt.

N. J., New Brunswick—July 25, by A. Merchant, archt., 1 Elm Row, general contract 10 story, basement, 75 x 80 ft., brick, steel, plain found., Bayard St. and Elm Row, for L. Walker, c/o architect. $200,000. Noted June 20.

N. J., Paterson — D. J. Scrocco, archt., 60 Park Pl., Newark, bids about Aug. 1, general contract 9 story, basement, 50 x 142 ft., brick, steel, rein.-con., 226 Bway., for A. L. Hoffspiegel, 282 Bway. $450,000. Noted June 28.

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., New York—Grand View Construction Co., c/o I. Broff, 332 East 149th St., bids about Aug. 20, materials and sub-contracts apartment and store, 2618 Bway. and 99th St. $1,000,000. Gronenberg & Leuchtag, 1385 Bway., archts. Noted July 11.

N. Y., New York—See "Contracts Awarded."

N. Y., Stapleton (sta. Staten Island)—B. Singer, archt., 921 Bergen Ave., Jersey City, bids about Aug. 1, general contract 6 story, basement, brick, steel, Bayview and Wards Aves., for Owner, c/o architect. Noted June 28.

O., Cleveland—M. Margolin, 1489 East 106th St., taking bids 3 story, basement, 56 x 135 ft., brick, 15303 Clifton Blvd. $150,000. M. Weis, 1836 Euclid Ave., archt.

Ore., Portland — G. C. Ulrich & Co., Stock Exch. Bldg., bids about Sept. 6, 4 story, basement, 100 x 100 ft., rein.-con., brick, plain found, 10th and Market Sts. $150,000. Lewis & Feig, Portland, archts.

Pa., Phila.—See "Contracts Awarded."

Contracts Awarded

Calif., Los Angeles—F. Sward, archt., Hibernian Bldg., 7 story, basement, brick, steel, rein.-con., Gramercy Pl. between 4 and 5th Sts., to Globe Eng. Co., Hibernian Bldg., $300,000.

Ill., Belleville—Belleville Hotel Co., 218 Commercial Bldg., 7 story, basement, 70 x 136 ft., brick, rein.-con. hotel, incl. 5 stories to Bergmann & Lutz, 519 Scheel St. Est. $600,000. Noted May 2.

N. Y., Brooklyn—El Mirosol, Inc., c/o H. Friedland, 152 Pierrepont St., East 6th St. and Brightwater Court, separate contracts. $650,000. J. J. Millman, 26 Court St., archt.

N. Y., Brooklyn—Sudia Operating Corp., H. Sugarman, pres., 16 Court St., 6 story, 89 x 150 ft., brick, timber, 67th St. and Colonial Rd., separate contracts. $500,000. W. T. McCarthy, 147 Pierrepont St., archt. Noted June 13.

Fla., Miami Beach — Strat Haven Holding Corp., 6 story, roof garden, Ocean Dr. between 4th and 5th Sts., to E. R. Lindabury, Inc., 9 Bastian Bldg.

La., Shreveport—Reynolds Hotel Co., 16 story, basement, rein.-con., brick, steel, stone hotel, to Ashton Glassell, Agurs Bldg. Est. $1,000,000. Noted May 16.

Mass., Brookline—M. Silverstein, 328 Cross St., Malden, 4 story, basement, brick, steel, plain found., Winthrop Rd., separate contracts. $160,000. Silverman & Brown, 73 Cornhill, Boston, archts.

Mass., Dorchester (sta. Boston)—H. Barron, 219 Callender St., 3 story, basement, 4 units, brick, plain founds., separate contracts. $150,000. M. Louis, 73 Cornhill, Boston, archt. Noted June 20.

Mo., Kansas City—P. Minkin, 1123 Lloyd Bldg., 10 story, basement, 50 x 100 ft., brick, concrete, terra cotta hotel, day labor. Private plans.

N. J., East Orange—Oraton Realty Co., J. Krieger, 8t. Francis Hotel, 24 East Park St., Newark, 6 story, basement, 100 x 135 ft., brick, steel, plain found., 499 William St., separate contracts. $500,000. Warren & Warren, 31 Clinton St., Newark, archts. Noted July 11.

N. Y., New York—Lendex Terrace Corp., J. P. Eadie, vice-pres., 191 9th Ave., 413-661 West 23rd St., to Henry Mandel Building Co., 10 East 40th St. Est. $6,000,000. Contractor taking bids on materials and sub-contracts.

N. Y., New York — Plaza Operating Co., F. Stern, pres., altering 18 story, 200 x 285 ft. hotel, 5-19 West 58th St., to G. A. Fuller Co., 949 Bway. Contractor takes bids on separate contracts and materials. Noted June 6.

N. Y., New York—B. Roth, 312 Schenectady Ave., Brooklyn, 370 Columbus Ave., separate contracts $725,000. Gronenberg & Leuchtag, 1388 Bway., archts.

Okla., McAlester—E. C. Aldridge, 10 story, basement, 100 x 140 ft., brick, rein.-con., plain found., 2nd St., to Sherritt & Parker, Wewoka, $40,000. Noted June 27.

Pa., Phila. — Kaplan Miller, Inc., Real Estate Bldg., 4 story, basement, 90 x 300 ft., rein.-con., brick, steel, plain found., 43 East Penn St., separate contracts, $700,000. A. C. Bieber, 1520 Locust St., archts.

Tex., Big Spring—A. J. Crawford, 7 story, basement, 77 x 140 ft., brick, stone, rein.-con. hotel addition, to A. L. Randall, Amarillo. Noted June 13.

Tex., Marshall—S. B. Perkins, c/o Perkins Dry Goods Co., Austin St., Dallas, 9 story, brick, steel, rein.-con. hotel, to Bellows-Maclay Constr. Co., Construction Bldg., Dallas, $184,000. Noted June 13.

Wash., Seattle—E. W. Morrison, archt., Lloyd Bldg., 6 story, basement, 60 x 108 ft., timber, to C. F. Martin, Seaboard Bldg., for L. W. LeSour, c/o architect. $150,000. Noted May 30.

Buildings—Commercial

Proposed Work

Calif., Alhambra—RECREATION CENTER—Biarritz, Inc., J. J. Tyrell, pres., 1328 East Main St., sketches by L. P. Millar & E. A. Hayes, 595 East Green St., Pasadena, recreation center, large theatre, banquet halls, shops. To exceed $500,000.

Calif., Los Angeles — GARAGE — Merchants Parking Arcade, Spring Arcade Bldg., sketches by K. Macdonald, Spring Arcade Bldg., 12 story, basement, 6th St. To exceed $150,000.

Calif., San Diego—OFFICE and EXCHANGE—Engineering Dpt. Pacific Telephone & Telegraph Co., 740 South Olive St., 4 story, 50 x 100 ft. side addition, and 1 story, 100 x 100 ft. top addition, steel, 9th and C Sts. $225,000.

Calif., San Francisco—BANK and OFFICE—Income Properties Corp., Alexander Bldg., sketches by G. W. Kelham, 315 Montgomery St., 25 story, basement, Class A, Sutter and Montgomery Sts. $2,000,000.

Calif., San Francisco—STORE—Moore, Inc., c/o A. Koller, archt., Crocker 1st Natl. Bank Bldg., probably 3 story, rein.-con., 840 Market St. $150,000 or more.

D. C., Wash. — MEMORIAL — Roosevelt Memorial Assn., 28 East 20th St., New York, plans by J. R. Pope, 542 5th Ave., New York, memorial. $1,000,000. Maturity in 1930.

Ill., Galesburg—HOSPITAL—Sister Superior Camille, St. Mary's Hospital, soon takes bids 5 story, basement, 45 x 80 x 80 ft. concrete, brick wing, plain found., South Cherry St. $150,000. H. B. Cox, Lehmann Bldg., archt.

Ill., Springfield—CAPITOL, etc.—State appropriated $280,000, repairing capitol building, incl. new roof; $90,000, improving executive mansion. C. H. Hammond, Capitol Bldg., superv. archt.

Md., Baltimore—GARAGE—Palmer & Lambdin, archts., 513 North Charles St., soon lets contract 5 story, basement, 56 x 186 ft., brick, concrete, 220 Guilford Ave., for Guilford Realty Co., G. E. Saulsbury, St. Paul and Lexington Sts. $155,000.

Mass., Attleboro — MASONIC TEMPLE — Ezekial Bates Lodge, A. F. & A. M. G. Blivin, soon takes bids 4 story, basement, 70 x 120 ft., brick, steel, plain found., North Main St. $150,000. W. T. Arnold, Journal Bldg., Meriden, archt. Noted Apr. 4.

Mass., Boston—MEDICAL—Owner, c/o A. P. Pearce, Jr., 15 State St., revised plans by Blackall, Clapp & Whittemore, 31 West St., 8 story, basement, 60 x 300 ft., brick, steel, limestone, plain found., Bay State Rd. and Sherborn St. $1,000,000. Noted Aug. 9.

Mass., Springfield—HOSPITAL—City, F. C. Parker, mayor, altering and constructing isolation hospital addition, State St. $150,000 or more. Engineer and architect not selected.

Mich., Detroit—WAREHOUSE and GARAGE—Michigan Bell Telephone Co., Case Ave., plans by Smith, Hinchman & Grylls, archts. and engrs., 800 Marquette Bldg., 2, 6 and 11 story, 300 x 340 ft., brick, rein.-con., plain found., Oakman Blvd. $1,500,000.

Minn., Minneapolis—STORE and OFFICE—W. B. Foshay Co., 9th St. and 2nd Ave. S., plans by Magney & Tusler, 104 South 9th St., story, basement, rein.-con., brick, steel, bedford stone, 8th St. and Marquette Ave. $150,000.

Minn., Minneapolis—WAREHOUSE—Argonaut Realty Co., General Motors Bldg., Detroit, Mich., P. F. Minnock, local mgr., Chevrolet Motor Co., 615 North 3rd St., plans by Albert Kahn, Inc., 1004 Marquette Bldg., Detroit, Mich., 1 and 2 story, basement, rein.-con., brick, Hennepin Ave. and Garfield St. N.E. $150,000.

N. J., Atlantic City — MAUSOLEUM — O. Schmidt, archt., Chelsea Bank Bldg., 1 soon lets contract 1 story, basement, 75 x 125 ft., brick, granite, steel, along English Creek, for Memorial Park Mausoleum Co., E. R. Hutton, secy., 902 Schwein Bldg. $200,000.

N. Y., Jamestown—EXCHANGE—Jamestown Telephone Co., plans by W. Watson & Associates, 4614 Prospect Ave., Cleveland, O., 3 story, basement, 60 x 130 ft., brick, rein.-con., plain found., $150,000.

N. J., Jersey City — STADIUM — Bd. City Comrs., City Hall, sketches by C. Ziegler, 26 Journal Sq., 1 story, brick, steel, rein.-con. memorial stadium, plain and concrete pile found., 75,000 seating capacity. Dales Ave. and State Hy. $1,000,000.

N. J., Jersey City—WAREHOUSE and COLD STORAGE—Pennsylvania R.R. Co., T. J. Skillman, ch. engr., Broad St. Sta., Phila., Pa., sketches by G. F. Bial, 645 Summit Ave., Union City, 8 story, basement, 320 bx 900 ft., brick, steel, rein.-con., concrete and wood pile found., Hudson River near Exchange River. $1,000,000.

N. J., Plainfield—CLUB—C. C. Wendehack, archt., 101 Park Ave., New York, rejected bids June 3, general contract 2 story, basement, brick, steel, plain found., Warrenville Rd., for Watchung Valley Country Club, $150,000. Will readvertise. Noted June 6.

N. Y., Long Island City—OFFICE—New York and Queens Light & Power Co., Bridge Plaza, plans by T. R. Eilenberg, 40-22 Lawrence St., Flushing, 9 story, 125 x 223 ft., brick, steel, Roosevelt Ave. and Lawrence St. $1,075,000.

N. Y., New York—EXCHANGE—New York Telephone Co., 140 West St., soon takes bids 111 x 184 ft., brick, steel, East 17th St. $2,115,000. Voorhies, Gmelin & Walker, 101 Park Ave., New York, archts. Bids about July 15, structural steel for same. Noted June 20.

N. Y., New York—LABORATORY—Montefiore Hospital, Gunhill Rd., plans by Kohn & Butler, 56 West 45th St., laboratory addition to main pavilion, $1,000,000.

N. Y., New York—LOFT—Varick Holding Corp., 565 5th Ave., plans by V. Mayper, 15 East 40th St., 16 story, 172 x 188 ft., brick, steel, Varick St., from Charlton to King Sts. $1,000,000.

N. Y., New York—OFFICE and STORE—M. E. Miller, 20 Wilmot St., Morristown, N. J., plans by Sugarman & Berger, 345 Madison Ave., 72 story, 26 West 37th St. To exceed $150,000.

N. Y., New York—THEATRE—T. W. Lamb, archt., 644 8th Ave., soon lets contract theatre, 216 West 52nd St. and 1651 Bway., for Warner Bros. Pictures, Inc., 321 West 44th St., $300,000. Noted June 20.

O., Cleveland—RESCUE HOME and HOSPITAL—Salvation Army, c/o H. Roberts, commander, 2304 East 9th St., plans by G. S. Rider Co., Century Bldg., 3 story, basement, brick, steel, concrete, Torbenson Rd. $150,000.

O., Cleveland—STORAGE and OFFICE—Fairmont Creamery Co., C. L. Dilts, dist. mgr., 608 Bolivar Rd., and 12th and Jones Sts., Omaha, Neb., sketches by F. V. Thomas, c/o owner at Omaha, Neb., 6 story, brick, steel, rein.-con., West 17th St. and Willey Ave. $600,000. Noted May 23.

Okla., Enid — Y. M. C. A. sketches brick, rein.-con. building, plain found. $300,000. Engineer and architect not selected.

Okla., Norman—COURT HOUSE—Cleveland Co., sketches 3 story, basement, brick, rein.-con., plain found., Main St. $175,000. Engineer and architect not selected.

Okla., Oklahoma City — AUTOMOBILE — Greenlease-Moore Chevrolet Co., plans by N. B. Fleming, Commercial Bldg., Tulsa, 2 story, basement, 140 x 150 ft., brick, rein.-con., plain found., 3rd and Walker Sts. $200,000.

Okla., Oklahoma City—MEMORIAL—State Bd. Affairs plans by J. Hicks, 145 East 14th St., 2 story, basement, 90 x 150 ft., granite, Bedford stone, near state house. $500,000. Noted Jan. 17.

Okla., Oklahoma City—OFFICE—Huckins Estate sketches 18 story, basement, 75 x 140 ft., Main and Bway. Sts. $500,000. Engineer and architect not selected.

Pa., Phila.—HOSPITAL—Women's Hospital of Philadelphia, c/o G. H. Earl, chn. building com., 41st and Parrish Sts., plans by Zantzinger Borie & Medary, Otis Bldg., rein.-con., brick, steel, plain found., 41st and Parrish Sts. $1,500,000.

Pa., Pittsburgh—HOSPITAL—J. L. Stuart, consult. engr., Oliver Bldg., will award separate contracts 15 story, brick, steel, North Ave. and Porterfield St., for Allegheny General Hospital. $6,000,000. York & Sawyer, 100 East 42nd St., New York, archts. This corrects report in June 27 issue.

S. C., Columbia—HOSPITAL—Baptist Hospital, W. M. Whiteside, supt., 4 story, basement addition, $150,000. $75,000 available from Duke Endowment.

Tex., El Paso—THEATRE—Dent Theatres, Inc., 2009½ Jackson St., Dallas, soon lets contract equal to 4 story, 100 x 200 ft., brick, stone, steel, rein.-con., $450,000. W. Scott Dunne, 303 Meba Bldg., Dallas, archt. Noted July 11.

Wash., Bellingham—OFFICE—Puget Sound Power & Light Co., 3 story, basement, 100 x 125 ft., State and Magnolia Sts. $175,000.

Ont., Galt — THEATRE — Famous Players Canadian Corp., Royal Bank Bldg., Toronto, plans by M. Brown, Confederation Bldg., Toronto, 2 and 3 story, basement, 75 x 161 ft., brick, concrete, steel, Water St. $150,000. Noted May 23.

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Buildings—Commercial (Continued)

Ont., Ottawa — BANK — Bank of Montreal, H.O.-111 St. James St., Montreal, Que., receiving competitive plans brick, concrete, stone, steel, marble, tile, terrazzo, Sparks St. $500,000.

Ont., Toronto—GARAGE and SHOW ROOM —See & Duggan, 621 Yonge St., plans by Mathers & Haldenby, 96 Bloor St. W., and soon take bids 2 story, part basement, 114 x 123 ft., concrete, brick, steel, Irwin Ave. $175,000.

Ont., Toronto—THEATRE and STORE—Bennett Investments Ltd., Temple Bldg., plans by H. G. Duerr, Lumsden Bldg., 2 or 3 story, basement, brick, steel, stone, concrete, Parliament St. $150,000.

Ont., Windsor — STATION, OFFICE and HOTEL—Canadian Natl. R.R., New Union Sta., Toronto, T. T. Irving, ch. engr., new station, office, hotel. $750,000.

Bids Asked

Ind., Bloomington—STORE—J. B. Smallwood taking bids brick, rein.-con., 212 West 6th St. $150,000. **R. Fuson, 205 Kresge Bldg.**, archt. Montgomery Ward Co., Chicago Ave. and Larr St., Chicago, Ill., lessee.

Ind., Ft. Wayne—BANK and OFFICE—Lincoln Natl. Bank & Trust Co., taking bids 28 story, basement, granite, $5,000,000. A. M. Strauss, 445 Cal-Wayne Ave., archt., Walker & Weeks, 2341 Carnegie Ave., Cleveland, O., assoc. archts. Noted June 27.

Mass., Gardner—HOSPITAL—July 25, by Dpt. Mental Diseases, State House, Boston, 2 story, basement, 65 x 115 ft., brick, stone, granite additional unit for semi-disturbed patients, plain found., for Commonwealth of Massachusetts, Boston. $150,000. C. P. Hoyt, 8 Beacon St., Boston, archt.

Mass., Mattapan (sta. Boston)—ADMINISTRATION—July 23, by Dpt. Mental Diseases, State House, 3 story, basement, irregular sized, brick, stone, plain found., at Boston State Hospital, est. $180,000; plumbing system $25,000; heating and ventilating system, $25,000, for Commonwealth of Massachusetts, Boston. Former bids rejected. Kendall, Taylor & Co., 152 Berkley St., Boston, archts. Noted Apr. 25.

Mass., Middleton—HOSPITAL—July 23, by Comrs., Essex Co., 3 story, basement, brick, steel tuberculosis hospital addition, plain found., at Essex County Sanitorium, $150,000. Ashton, Huntress & Alter, 477 Essex St., Lawrence, archt. Noted July 4.

Mass., Quincy — STORE, OFFICE and BOWLING ALLEYS—See "Contracts Awarded."

Mass., Waltham—STORE and OFFICE—See "Contracts Awarded."

Mass., Westboro—HOSPITAL—July 24, by Dpt. Mental Diseases, Commonwealth of Massachusetts, State House, Boston, altering and constructing 2 story, basement, brick, steel addition to Westboro State Hospital. $150,000. Private plans.

Mass., Wrentham—NURSERY—July 24, by Dpt. Mental Diseases, 3 story, basement, brick, plain found., at Wrentham School, for Commonwealth of Massachusetts, $150,000. Kendall, Taylor & Co., 209 Columbus Ave., Boston, archts.

Minn., Willmar—HOSPITAL—July 23, by State Comm. Administration & Finance, Capitol, St. Paul, two 2 story, basement, brick, stucco cottages, at Hospital for Insane. $155,000. C. H. Johnson, 360 Robert St., St. Paul, archt.

N. J., Boonton—COUNTRY CLUB—Walker & Gillette, archts., 369 Lexington Ave., New York, taking bids general contract 2 story, basement, 85 x 230 ft., brick, plain found., Troy Hills Sect., for Knoll Golf Club, c/o architects, $150,000. Noted May 16.

N. J., East Orange — BANK — Holmes & Winslow, archts., 153 East 38th St., New York, bids about Aug. 15, general contract 2 story, basement, brick, steel, plain found., for Ampere Bank, 227 North 18th St. $150,000. Noted June 28.

N. J., Jersey City — LOFT and STORE — Owner, or C. H. Ziegler, archt., 26 Journal Sq., bids about Aug. 1, 3 story, basement, brick, steel, plain found., Hudson Blvd. $150,000. Noted July 4.

N. J., Montclair—CLUB—A. G. Brach, archt., 60 Park Pl., Newark, bids about Aug. 1, general contract 2 story, basement, brick, steel, plain found. $200,000. Noted June 28.

N. J., Montclair — PROFESSIONAL — A. E. Ramhurst, archt., 516 Bloomfield Ave., bids about Aug. 15, general contract two 3 story, 30 x 145 ft., brick, steel, plain found., Bellevue Ave., for A. L. Wallace, 204 Bellevue Ave., Upper Montclair. $150,000. Noted July 11.

N. J., Paterson — DETENTION JAIL and HALL of RECORDS—Bd. Freeholders Passaic Co., Court House, bids about Aug. 15, general contract 8 story, basement, brick, steel, plain found., Grand and Spring Sts. $1,000,000. H. B. Crosby, 125 Ellison St., Paterson, archt. Noted July 4.

N. J., Paterson—THEATRE and STORE—A. E. Sleight & Son, archts., 136 Washington St., bids about Aug. 1, general contract 1 story, basement, 75 x 120 ft., brick, steel, plain found., Market St., for Owner, c/o archt. $150,000. Noted July 11.

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N. J., Perth Amboy—LOFT and STORE—B. Goldberger, archt., 117 Smith St., bids about Aug. 1, general contract 3 story, basement, brick, steel, plain found., State St., for C. I. Silk, 189 Rector St. $150,000. Noted June 11.

N. Y., Brooklyn — COURT HOUSE — J. J. Byrne, pres., Brooklyn Boro, Boro Hall, bids about Sept. 1, 11 story, 199 x 200 ft., Schermerhorn and Smith Sts. $4,000,000. Collins & Collins, 19 West 44th St., New York, archts. Noted July 12.

N. Y., Buffalo—OFFICE—July 30, by F. D. Roosevelt, gov. and chn. State Office Site & Building Comn., Capitol, Albany, construction, structural steel and iron; also foundation, for State Office Building; adv. E. N.-R. July 18. Noted Apr. 11.

N. Y., New York—EXCHANGE—New York Telephone Co., 140 West St., bids about Aug. 1, general contract 10 story, 100 x 125 ft., brick, West 51st St. $2,000,000. Voorhies, Gmelin & Walker, 101 Park Ave., New York, archts. Structural steel, awarded to Hedden Iron Wks., 30 Church St. Noted June 20.

N. Y., New York—RESTAURANT, KITCHEN, etc.—Vischer & Burley, archts., 51 East 42nd St., bids about Aug. 1, restaurant and kitchen, Chanin Building, $300,000. Windsor Restaurant, 23 John St., lessee.

N. Y., New York—STORAGE and STORE—See "Contracts Awarded."

O., Hudson—HOSPITAL and ADMINISTRATION—Aug. 2, by City, D. B. Blossom, dir. P. Welfare, 2 story, basement, 40 x 120 ft., brick, Hudson Boys Farm. $150,000. H. Kregelius, 604 City Hall, Cleveland, archt.

O., Toledo—OFFICE and BANK—July 28, by Mills, Rhines, Bellman & Nordhoff, Ohio Bldg., 25 story, 150 x 200 ft., brick, steel, stone, plain found., Madison St., for Ohio Savings Bank Co., Ohio Bldg. Est. $3,000,000. For 4,500 tons structural steel awarded to American Bridge Co., 1414 East Bway. Noted Jan. 24.

Pa., Phila. — BANK — July 26, by A. H. Brockie, archt., 254 South 15th St., 8 story, basement, 62 x 85 ft., rein.-con., brick, steel, plain found., Germantown and Chelten Aves., for Germantown Trust Co., c/o architect. $300,000.

Pa., Tyrone—MASONIC TEMPLE—Tyrone Lodge 94, F. & A. M., bids about July 23, Masonic temple, $150,000. Hersh & Shollar, Altoona, archts.

Ont., Kingston — HOSPITAL — C. Drever, archt., 81 Brock St., taking bids 5 story, basement, 40 x 126 ft., concrete, steel, stone addition, for Hotel Dieu Hospital, Brock St. $200,000. Noted Jan. 17.

Contracts Awarded

Calif., Beverly Hills—BANK and OFFICE—First Natl. Bank, 6 story, Class "A" Santa Monica Blvd., to Lange & Bergstrom, Washington Bldg., Los Angeles, $400,000.

Calif., San Francisco—OFFICE—Crown Zellerbach Paper Co., 524 Battery St., reconstructing and constructing 4 story addition, Sansome and Halleck Sts., to Jacks & Irvine, 74 New Montgomery St., $500,000. Noted June 20.

Conn., Hartford—GARAGE and SHOWROOM —R. P. Taber, 128 Allyn St., 1 story, 200 x 250 ft., brick, steel, rein.-con., to Wise & Upson, 7 Forest St. Est. $175,000. Noted June 20.

Conn., New Haven—DEPARTMENT—Yale University, T. Farnum, constr. supt., 6 and 4 story, tower, 70 x 325 ft., brick, stone, steel, to G. A. Fuller, 949 Bway., New York. Est. $1,000,000. Noted June 13.

Fla., Miami Beach—THEATRE, etc.—Miami Beach Pier Corp., G. R. K. Carter, pres., theatre, promenade deck, band stand, to E. R. Lindabury Co., Inc., 9 Bastian Bldg., Lincoln Rd. $150,000.

Ga., Atlanta—STORE—Peters Land Co., Peters Bldg., 3 story, rein.-con., brick, to Barge-Thompson Co., 126 Ellis St. N.E. $150,000. Noted June 13.

Ind., Indianapolis — EXCHANGE — Indiana Telephone Co., steel, brick, 5747 East Washington St., to L. Colvin, 823 Continental Bldg. Est. $150,000.

Ind., Indianapolis—GARAGE—W. W. Hammond, 307 Odd Fellows Bldg., brick, stone, rein.-con., 30th and Pennsylvania Sts. $150,000. Owner builds. Doeppers & Lennox, 226 East Michigan Ave., archts.

Ind., Lafayette—HOSPITAL—Tippecanoe Co., general contract brick, rein.-con. tuberculosis hospital, to A. R. Hunnicut, Union City. Est. $150,000.

Ind., Princeton—THEATRE—J. B. Green, general contract brick, steel, 226 West State St., to C. D. Mitchell, Charleston, Ill. Est. $150,000.

Ind., South Bend—OFFICE and FACTORY—J. Baumgarth Co., 1219 West Washington St., Chicago, Ill., general contract 2 story, basement, 302 x 414 ft., brick, rein.-con., 3400 West Sample St., to R. Sollitt, 518 East Sample St. Est. $250,000.

Ia., Davenport—STORE—Renwick Estate c/o W. G. Renwick, 6 Beacon St., Boston, Mass., 3 story, 133 x 150 ft., rein.-con., brick, stone, 2nd and Brady Sts., to Priester Constr. Co., Kahl Bldg., Davenport, Ia. Est. $300,000. Sears, Roebuck & Co., Arthington and Homan Sts., Chicago, Ill., lessee.

Me., Portland—HOSPITAL—Maine General Hospital, brick, steel, Arsenal St., to F. A. Rumery Co., 537 Congress St. Est. $200,000. Noted Dec. 8.

Mass., Boston — STORE — R. H. Stearns & Co., 140 Tremont St., altering 11 story, basement, 55 x 185 ft., brick, steel, stone, plain found., Tremont St., to W. H. Wentworth Co., 107 Pacific St., Cambridge. Est. exceeds $150,000.

Mass., Dorchester (sta. Boston)—STORE and OFFICE—S. S. Kresge Co., Kresge Bldg., Detroit, Mich., 3 and 4 story, basement, 65 x 100 ft., brick, stone, plain found., to L. B. Cadario & Sons, 260 Tremont St. Est. $150,000 or more. Noted July 11.

Mass., Quincy—STORE, OFFICE and BOWLING ALLEYS—J. A. Keating, Seville St., 3 story, basement, brick, steel, plain found., separate contracts. $150,000. J. S. Joslin, 339 Newbury St., Boston, archt. Noted June 6.

Mass., Salem—THEATRE—Salem Realty Co., 126 Washington St., and 85 Devonshire St., Boston, 3 story, basement, 150 x 315 ft., brick, rein.-con., steel, plain found., Essex St., to C. S. Cunningham & Sons Constr. Co., 80 Boylston St. Est. $500,000. Noted June 13.

Mass., Waltham—MARKET—J. H. Beattie Co., 717 Moody St., 1 and 2 story, cell, basement, brick, concrete, steel, plain found., to J. E. Griffin Co., 250 Stuart St., Boston. Est. $150,000. Noted May 23.

Mass., Waltham — STORE and OFFICE — Snider & Druker, 18 Tremont St., Boston, 2 story, basement, 100 x 125 ft., brick, stone, granite, plain found., Moody St., separate contracts. $150,000 or more. G. N. Jacobs, 37 Providence St., Boston, archt.

Miss., Meridian—OFFICE—Threefoot Realty Corp., c/o L. M. Threefoot, 15 story, basement, 67 x 125 ft., rein.-con., steel, granite, terra cotta, stone, to Garber & Lewis, Jackson. $278,800. Noted June 13.

N. J., Chatham—BANK—Palmer & Plonsky, archts., 55 William St., New York, general contract 1 story, basement, brick, steel, plain found., to Bontempo & D'Annunzio, Inc., 39 Washington St., Morristown, for Chatham Trust Co., 126 Main St. Est. $150,000. Noted June 13.

N. J., Newark—OFFICE—M. E. Stout, archt., Gibraltar Bldg., general contract 8 story, basement, 75 x 150 ft., brick, steel, plain found., to E. M. Waldron, Inc., 40 Park Pl., for Prudential Insurance Co., Prudential Bldg. Est. $500,000. Noted June 20.

N. J., Plainfield—OFFICE—Owner, general contract 2 story, basement, brick, steel addition, plain found., West 2nd St., to C. S. Rollerson, 400 Watchung Ave. Est. $150,000.

N. J., Totowa (mail Paterson)—BANK—Totowa Natl. Bank, 365 Totowa Ave., general contract 1 story, basement, brick, steel, plain found., to J. H. Steele & Son, 42 North 2nd St., Paterson. Est. $150,000. Noted Mar. 14.

N. Y., New York—EXCHANGE—New York Telephone Co., 140 West St., altering and constructing 103 x 278 ft., brick, steel top addition, to Turner Constr. Co., Graybar Bldg. Est. $1,000,000. Noted June 13.

N. Y., New York—STORAGE and STORE—One Hundred Twenty-Fifth St. and Lenox Ave. Corp., 280 Madison Ave., 6 story, brick, timber, Lenox Ave. and 125th St., day labor and separate contracts. $200,000. Gronenberg & Leuchtag, 1385 Bway., archts. Noted May 16.

O., Cleveland—HOSPITAL—City, group 3 story, basement, brick, steel, concrete buildings, to C. Shutrump & Son Co., Erie Bldg., $1,152,140. Noted June 20.

Okla., Oklahoma City—PUBLISHING—Oklahoma Publishing Co., 3 story, 58 x 140 ft., brick, rein.-con., plain found., 4th and Bway. Sts., to Reinhart & Donovan Co., Trades Natl. Bank Bldg., $700,000.

Okla., Oklahoma City—OFFICE—Physicians Holding Co. plans by H. Reynolds, Terminal Arcade, 4 story, 75 x 75 x 100 ft., brick, rein.-con. addition to Osler Building, plain found., 1200 North Walker St. $150,000.

Okla., Shawnee — LODGE — A. F. & A. M. Lodge 27, 5 story, 100 x 140 ft., brick, rein.-con., plain found., to Cowen Constr. Co., Shawnee. $226,861. Noted July 11.

R. I., Newport—BANK—Savings Bank of Newport, H. G. Wilkes, 284 Thames St., brick, stone, to L. R. Porter Co., 197 Washington St., Salem, Mass. Est. $150,000. Noted Feb. 28.

Tex., Galveston—HOSPITAL—Sealy & Smith Foundation Co., c/o East Randall St., chn. building com., 4 story, 50 x 200 ft., and 5 story, 25 x 50 ft. addition, to Bellows-Maclay Constr. Co., Const. Bldg., Dallas. Est. $450,000. Noted June 20.

Vt., Rutland — HOSPITAL and NURSES HOME — Rutland Hospital Assn., M. Sawyer, Rutland, brick, steel, to C. G. Noyes, Rutland. Est. $200,000. Noted June 20.

Wash., Seattle — OFFICE — V. W. Voorhees, archt., Lloyd Bldg., 15 story, basement, 60 x 120 ft., concrete, steel, to West Coast Constr. Co., Lloyd Bldg., for J. Vance, c/o architect. $341,000. Noted June 6.

Wis., Dane—SANATORIUM—Dane Co. (Madison), general contract 3, 4 and 5 story, 60 x 225 ft. sanatorium, 3 story, 45 x 75 ft. wing, to J. P. Cullen & Son, Janesville, $238,288; heating, to A. M. Toussaint, Madison, $26,983; plumbing, to J. E. Robertson Co., Wauwatosa, $24,987. Grand total $290,258.

Ont., London—OFFICE—O. Roy Moore, St. James Apts., 8 story, basement, 65 x 108 ft., brick, limestone, to Putherbough Constr. Co., Bank of Montreal Chambers. Est. $300,000. Noted June 27.

Buildings—Commercial (Continued)

Ont., Toronto—CLUB—**Granite Club, 63 St. Clair Ave.**, general contract 3 story, basement, brick, stone addition, concrete found., to Robertson & Janin of Ontario, Ltd., Commerce & Transportation Bldg. Est. $150,000. Noted June 6.

Ont., Toronto—HOSPITAL—Toronto Hospital, addition, to Holtby Bros. Ltd., 61 Hepburne St., $185,000.

Buildings—Educational, Religious

Proposed Work

Colo., Alamosa — COLLEGE — Adams State College, c/o I. Richardson, pres., college addition, incl. auditorium, library, science dept., classrooms, heating plant. $150,000. Private plans.

Conn., Hartford—CHURCH—**Advent Christian Church**, A. Rollins, pastor, plans by Ebbets & Frid, 15 Lewis St., 1 story, basement, brick, May St. Est. $150,000.

Conn., Mansfield—DORMITORIES—State of Connecticut, Finance Com. E. Hall, plans by Towner & Sellew, 363 Main St., Middletown, brick, steel, at Mansfield Training School and Hospital. $220,000. Noted May 9.

Ill., Naperville—GYMNASIUM—North Central College, F. W. Umbreit, pres., sketches by J. C. Llewellyn & Son, 138 South Dearborn St., Chicago, 2 story, rein.-con., brick, stone, Ft. Hill campus. $350,000.

Ill., Urbana—GYMNASIUM—University of Illinois plans by C. H. Hammond, Capitol Bldg., Springfield, women's gymnasium, on campus. $300,000 appropriated.

Ind., Fishers—HIGH SCHOOL—School Comrs. plans by A. A. Faulstich, Cicero, brick, steel, incl. class rooms, gymnasium, auditorium. $150,000.

Ia., Perry—HIGH SCHOOL—Bd. Educ., c/o secretary sketches by Keffer & Jones, 202 Masonic Temple Bldg., Des Moines, 3 story, rein.-con., brick, stone, $160,000.

Me., Auburn—HIGH SCHOOL—City, G. R. Gardner, supt. schools, rejected bids 2 story, basement, 70 x 200 ft., brick addition to Edward Little School, plain found. $200,000. Miller & Beal, 465 Congress St., Portland, archts. Noted June 27.

Mass., Brighton (sta. Boston)—SCHOOL—City of Boston, Schoolhouse Dpt., sketches by G. N. Jacobs, 9 Bosworth St., altering and constructing 2 story, basement, brick, limestone addition, plain found., Strathmore Rd. and Chestnut Hill Ave. $150,000 or more. Noted May 23.

Mass., Cambridge—CLUB HOUSE—Harvard University (Harvard Faculty Club, lessee), sketches by Coolidge, Shepley, Bulfinch & Abbott, Ames Bldg., Boston, 4 story, basement, brick, plain found., Quincy St. $200,000. Noted July 4.

Mass., Dorchester (sta. Boston)—SCHOOL—City of Boston, Schoolhouse Dpt., sketches by D. Somes, 240 Boyleston St., Boston, altering and constructing 2 story, basement, brick limestone addition to Wm. Bradford School, Willowood St. $150,000.

Mass., Dorchester (sta. Boston)—SCHOOL—City of Boston, Schoolhouse Dpt., sketches by J. M. Gray, 175 High St., Boston, altering and constructing 2 story, basement, brick, limestone addition to T. J. Kenney School, plain found., Oak Ave. $195,000.

Mass., East Bridgewater—SCHOOL—Town, H. L. Morehouse, chn., plans by W. S. Holmes, 192 Boylston St., Boston, 2 story, basement, brick, steel, incl. auditorium. $250,000. Hendrick & Haywood, 192 Boylston St., Boston, engr. Noted June 6.

Mass., Jamaica Plain (sta. Boston)—HIGH SCHOOL—City of Boston, Schoolhouse Dpt., sketches by G. E. Robinson, 80 Federal St., Boston, altering and constructing brick, limestone addition, plain found., incl. gymnasium, assembly hall, Elm St. To exceed $150,000.

Mass., Jamaica Plain (sta. Boston)—SCHOOL—City of Boston, Schoolhouse Dpt., sketches by Funk & Wilcox, 26 Pemberton Sq., Boston, altering and constructing 2 story, basement, brick, limestone addition to Margaret Fuller School, plain found., Glen Rd. $160,000.

Mass., Jamaica Plain (sta. Boston)—SCHOOL—City of Boston, Schoolhouse Dpt., sketches by McLaughlin & Burr, 88 Tremont St., 2 story, basement, brick, limestone intermediate school, Pershing Rd. and Centre St. $150,000. Noted June 6.

Mass., Newton Centre (br. Boston)—HIGH SCHOOL—City, E. O. Childs, mayor, City Hall, U. G. Wheeler, supt., sketches by Henry & Richmond, 12 West St., Boston, Junior and Senior School, brick, Clark and Halcyon Rds. $150,000. Noted June 6.

Mass., Peabody — SCHOOL — St. Josephs Juniorate of the Xaverian Bros., 172 Andover St., plans by M. P. Meade, 80 Boylston St., Boston, 2 and 2½ story, basement, irregular sized, brick, timber school group, incl. classroom buildings, chapel, dormitory, dining hall, Oak Hill, Andover St., Juniorate and Farm Aves. To exceed $150,000.

Mass., Taunton — CHURCH — St. Anthony's Roman Catholic Parish, School St., raising $150,000 or more funds, church, School St. Engineer and architect not selected.

Mass., Wakefield—SCHOOL—Town, F. J. Henkel, chn. building com., plans by E. M. Bridge, 248 Boylston St., Boston, altering and constructing 2 story, basement, brick, steel, limestone addition, plain found., Montrose Dist. $150,000. Whidden-Beekman Eng. Co., 150 Stuart St., Boston, engrs. Noted May 2.

Mass., Wellesley — ADMINISTRATION — Wellesley College, E. F. Pendleton, pres., revised plans by C. Z. Klauder, 1429 Walnut Ave., Phila., Pa., college grounds. $1,250,000. Noted July 11.

Mich., Ann Arbor—DORMITORY—University of Michigan plans by York & Sawyer, 100 East 42nd St., New York, 4 story, brick, steel, stone, rein.-con., Tappan Ave. $75,000.

Minn., St. Paul—SCHOOL—City, c/o L. R. S. Ferguson, comr., education, plans by F. X. Tewes, City Hall, 2 story, basement, rein.-con., brick addition, Earl and 3rd Sts. $150,000.

N. J., Clifton—SCHOOL—Bd. Educ., High School, soon lets contract School 4, 2 story, basement, brick, steel, rein.-con., plain found., Lakeview Ave. $150,000. Lee & Hewitt, 152 Market St., Paterson, archts. Noted Mar. 22, 1928.

N. J., Middletown—SCHOOL—Bd. Educ., Middletown twp. plans by E. A. Arend, Kinmouth Bldg., Asbury Park, East Keansburgh School, 2 story, basement, brick, steel. $150,000.

N. J., New Market—SCHOOL—Bd. Educ., Piscataway Twp., school, Stelton Rd. $225,000. J. N. Pierson & Son, Perth Amboy, engr.

N. J., Piscataway (mail New Brunswick) — SCHOOL—Bd. Educ., Township Hall, sketches by J. N. Pierson & Son, 705 Park Ave., Plainfield, 2 story, basement, brick steel, rein.-con. $200,000.

N. J., Riverdale—SCHOOL—Bd. Educ., Town Hall, bids early in August, story, basement, brick, steel, rein.-con., plain found. $150,000. Rassmussen & Wayland, 36 West 47th St., New York, archts. Noted June 27.

N. Y., Holley—SCHOOL—Town Bd. school. $260,000.

N. Y., Larchmont—SCHOOL—Bd. Educ. soon lets contract 3 story school addition. Knappe & Morris, 171 Madison Ave., New York, archts. M. Hiller, 369 Lexington Ave., engr.

N. Y., New York—HOME—Hebrew Children's Home, 30 West 120th St., bids in August, home, 205th St. and Grand Concourse. $500,000. Block & Hess, 18 East 41st St., archts. Noted Apr. 12.

N. Y., New York—SYNAGOGUE—Congregation Talmud Torah Sons of Israel, plans by L. Uffner, 110 West 42nd St., 2 and 3 story, 82 x 115 ft. synagogue.

O., Euclid (br. Cleveland)—CHURCH—East Shore Blvd. Methodist Episcopal Church, M. M. Brown, pastor, 22301 Lakemont Ave., Cleveland, sketches by Bureau of Architecture of Methodist Church, 1701 Arch St., Phila., Pa., church, East 222nd St. and Shore Blvd. $200,000. Noted Jan. 31.

R. I., Cumberland (mail Manville)—MONASTERY—Franciscan Brothers, A. Hickey, bishop, sketches by A. J. Murphy, 25 Fenner St., Providence, group brick, steel buildings. To exceed $150,000.

Tenn., Knoxville — ENGINEERING — University of Tennessee plans by Barber & McMurray, General Bldg., 200 x 250 ft. engineering building.

Ont., Windsor—CATHEDRAL—St. Clair Anglian Diocese cathedral. $1,000,000.

Bids Asked

Conn., Bloomfield—HIGH SCHOOL—**Aug. 1**, by Town, School Bd., 2 story, basement, 114 x 150 ft., brick, Park Ave. $150,000. W. P. Crabtree & Son, 410 Asylum St., Hartford, archts. Noted Apr. 18.

Ill., Naperville—GYMNASIUM—North Central College, F. W. Umbreit, treas., bids about Dec. 1, 2 story, 120 x 200 ft., rein.-con., brick, stone, Ft. Hill campus. $350,000. J. C. Llewellyn & Sons, 138 South Dearborn St., Chicago, archts. Noted July 18.

Ind., Bridgeport—SCHOOL—**July 25**, by V. C. Davis, school trustee, R.R. 2, Indianapolis, brick, rein.-con. school. $150,000. C. Byfield, Peoples Bank Bldg., Indianapolis, archts. Noted Apr. 18.

Ind., Elkhart—HIGH SCHOOL—**July 25**, by School Comrs., brick, stone, rein.-con. high school, Bango Twp. $150,000. Henkle & Hanson, Connersville, archts. Noted May 2.

Ind., Indianapolis—SCHOOLS—**July 25**, by V. C. Davis, school trustee, R.R. 2, 2 brick, rein.-con., one at Flackville and other at Garden City. $150,000 each. C. Byfield, 923 Peoples Bank Bldg., archt.

Me., Portland—CHURCH—**St. Peter's Roman Catholic Church**, T. DeMingo, pastor, taking bids 1 story, basement, 90 x 105 ft., brick, stone, plain found., Federal St. $150,000. M. J. Mastrangelo, 369 Hanover St., Boston, Mass., archt. Noted Feb. 28.

Md., Violetville (mail Baltimore)—SCHOOL—July 23, by Bd. Awards, Baltimore, 2 story, 63 x 244 ft., concrete, stone. $150,000. W. F. Stone, Munsey Bldg., Baltimore, archt. Noted Oct. 4.

Mass., Boston—SCHOOL—July 24, by Schoolhouse Dpt., City Hall, 2 story, basement, 65 x 140 ft., brick, limestone, granite addition to Michael Angelo School, plain found., Hull St. $150,000 or more. J. M. Gray, 175 High St., archt. Noted June 20.

Mass., Gardner — CHURCH and SUNDAY SCHOOL — Methodist Episcopal Church, C. Clark, pastor, taking bids 1 story, basement, brick, stone, plain found., Chestnut St. $150,000. A. Smith, 58 Front St., Worcester, archt.

Mass., Southboro—SCHOOL—Town, School Bd., taking bids 2 story, basement, brick, stone, steel, plain found. $150,000. C. M. Baker, 25 Arch St., Boston, archt.

Mich., Grosse Pointe Farms (br. Detroit)—SCHOOL—Aug. 5, by C. A. Parcells, secy. Bd. Educ., 2 story, basement, 60 x 300 ft., brick, steel, rein.-con., plain found., Ridge Rd. $200,000. R. O. Derrick, Union Trust Bldg., Detroit, archt.

N. H., Berlin—SCHOOL—St. Ann's Roman Catholic Parish, A. Melanson, pastor, taking bids, brick, stone school, auditorium, 3rd St. $200,000. W. E. Provost, 1061 Elm St., Manchester, archt. Noted May 9.

N. J., Highlands—SCHOOL—Bd. Educ., Boro Hall, bids about Aug. 1, 2 story, basement, brick, steel, rein.-con., plain found., Navesink and Waterwich Sts. $165,000. L. V. Pohlman, 80 Broad St., Elizabeth, archt. Noted June 13.

N. Y., Brooklyn—SCHOOL—July 25, by W. C. Martin, supt. School Buildings, Flatbush Avenue extension and Concord St., P. S. 208, Avenue D between East 48th and East 49th Sts., for Bd. Educ., 500 Park Ave., New York.

N. Y., Cornwall—SCHOOL—Aug. 2, by Bd. Educ., school, Rasmussen & Wayland, 36 West 47th St., New York, archts. Noted June 20.

N. Y., Lockport—SCHOOL—July 20, by Bd. Educ., High School Bldg., school, West Ave. School Site.

O., Akron—SCHOOL—July 29, by Bd. Educ., I. Moses, clk., 3 story, 32 classroom, La Follette St. $350,000. M. M. Konarski, Central High School Bldg., archt.

Pa., Mt. Lebanon (mail Pittsburgh) — HIGH SCHOOL—Ingham & Boyd, archts., Empire Bldg., Pittsburgh, bids about Aug. 20, high school, Cochran Rd., for Bd. Educ. $250,000.

Utah, Copperton—HIGH SCHOOL—July 25, by School Bd., Jordan School Dist., Sandy, 3 story, basement, rein.-con., brick. $245,000. Scott & Walsh, Dooly Bldg., Salt Lake City, archts.

Wis., Madison—SCHOOL—July 30, by Bd. Educ., F. W. Erickson, secy., 22 West Dayton St., (1st unit), West Side High School, 3 story, 200 x 400 ft., brick, cut stone, concrete, plain found. $400,000. Law, Law & Potter, 1 South Pickney St., archts.

Contracts Awarded

Ala., Florence—SCHOOLS—State Bd. Educ., R. E. Tidwell, supt., Montgomery, Bibb Graves Hall, 3 story, basement, 103 x 183 ft., also altering, and constructing 1 story, basement, 91 x 137 ft. addition to training school auditorium, to A. Blair, Montgomery, $204,878; 3 story, basement, 76 x 294 ft. dormitory, and 2 story, basement, 106 x 195 ft. classroom building, at Troy, to Hugger Bros., Montgomery, $399,870. Noted June 20.

Calif., Sacramento—SCHOOL—C. B. Hughes, clk. Bd. Educ., rein.-con., brick additions to Colma and Donner Schools, to H. Finnegan, 1814 17th St., $152,620. Noted May 23.

Calif., San Francisco—SCHOOL—City and San Francisco Co., general contract Park Presidio Jr. High School, part 3 and 4 story, rein.-con., to Meyer Bros., 727 Portola Dr., $502,930; electrical work, to Alta Electric Co., 928 Howard St., $39,775; plumbing and mechanical work, to Scott Co., 243 Minna St., $38,387 and $61,200 respectively. Grand total $732,292. Noted June 13.

Conn., Hartford—CHURCH—Broadview Community Church, S. B. Crosland, pastor, brick, stone, to M. W. Wadhams Co., 15 Lewis St. Est. $150,000. Noted Dec. 13.

Conn., New Haven—GYMNASIUM—Yale University, J. R. Angell, pres., brick, steel, stone, to Marc Eidlitz & Sons, 41 East 42nd St., New York. Est. $500,000. Contractor taking bids on materials and sub-contracts. Noted Mar. 14.

Conn., New Haven — LAW — Bd. Trustees, Yale University, brick, steel, stone law group, to Sperry & Treat, 294 Kentucky Ave. Est. $3,000,000. Noted June 13.

Ind., Ft. Wayne—SCHOOL—School Comrs., general contract brick, rein.-con., to Rump-Kintz, 210 Medical Arts. Est. $150,000. Noted June 20.

Ind., Hammond—CHURCH—Catholic Church, general contract 65 x 130 ft., brick, steel, hollow tile, Sibley St., to Foster Lumber Co., Valparaiso. Est. $150,000.

Ind., Indianapolis — CHURCH — Lutheran Church, general contract brick, steel church, school building, Orange and Laurel Sts., to Brandt Bros., 512 Ind. Trust. Est. $150,000.

Ind., Indianapolis—SCHOOLS—School Comrs., general contract School 50, Belleview and Ohio Sts., to Hayes Bros., 236 West Vermont St., est. $150,000; School 3, 23 North Rural St., to

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Buildings—Educational, Religious (Cont.)

W. H. Johnson & Son, 370 East St. Joe St., est. $150,000, both brick, steel.

Ind., Mays—SCHOOL—School Comrs., general contract brick, steel, to E. Anderson, Centerville. Est. $150,000.

Ind., Pleasant Lake—SCHOOL—School Comrs., Steuben Co., general contract brick, rein.-con., to W. R. Dunkin & Son, Huntington. Est. $150,000. Noted June 13.

Ind., Plymouth — CHURCH — Presbyterian Church, general contract, brick, steel, to A. W. Thompson, Plymouth. Est. $150,000.

Ind., South Bend—SCHOOL—School Comrs., general contract brick, steel, to J. Nelson Co., 212 Monroe St. Est. $150,000.

Ind., West Lafayette — MECHANICAL ENGINEERING—Purdue University, brick, rein.-con., to G. W. North Constr. Co., 9th and Tippecanoe Sts., Terre Haute. Est. $150,000. Noted May 2.

Mass., Amherst — SCHOOL — Town, School Bd., 2 story, basement, 75 x 125 ft., brick, plain found., to S. Brown, 13 High St. Est. $150,000. Noted Mar. 14.

Mass., Natick—SCHOOL—Town, Bd. Selectmen, altering and constructing 1 and 2 story, basement, brick, stone addition, plain found., to E. T. Wilson, Washington St. Est. $150,000. Noted Mar. 7.

Mass., Springfield—CHURCH—St. James Episcopal Church, T. Davies, bishop, 11 story, basement, brick, stone, East Springfield, to W. A. Newton, Mill River Lane. Est. $200,000. Noted July 4.

Mass., Taunton—SCHOOL—Immaculate Conception Roman Catholic Parish, M. J. O'Reilly, pastor, 387 Bay St., 2 story, basement, brick, plain found., to L. M. Witherall, 29 Court St. Est. $150,000. Noted June 27.

Mass., Webster—SCHOOL—St. Louis Roman Catholic Parish, G. H. Dolan, pastor, 15 Lake St., 1 and 2 story, basement, 58 x 97 ft., and 84 x 157 ft., brick, steel, to J. M. and C. J. Buckley Co., 128 Vernon, Worcester. $157,000. Noted May 2.

Mich., Detroit—CHURCH and CHAPEL—St. Cecelia Roman Catholic Church, Livernois and Stearns Aves., 2 story, basement, brick, steel, rein.-con., plain found., to W. E. Wood Co., Union Trust Bldg. Est. $300,000.

Mich., Detroit—SCHOOL—Bd. Educ., 1354 Broadway, 2 story, basement, 95 x 240 ft., brick, steel, stone, rein.-con., plain found., to H. M. Martens, 709 Francis Palms Bldg., $155,000; heating, to Freyn Bros., 3850 Michigan Ave., $61,772. Noted July 11.

Mich., Utica—HIGH SCHOOL—J. Harvey, secy. Bd. Educ., 2 story, basement, 127 x 153 ft., brick, steel, rein.-con., plain found., to J. M. Olson, Pontiac. Est. $150,000. May 20.

N. J., Caldwell—HIGH SCHOOL—Bd. Educ., High School, general contract 3 story, basement, 50 x 70 ft. and 3 story, basement, 50 x 100 ft., brick, steel, plain found., to D. J. Cronin, 713 South Orange Ave., Newark. $288,500; plumbing, to J. A. Faber Plumbing Co., 237 Diamond Bldg., Hawthorne, $32,422; heating, to J. H. Conney, Inc., 210 North 4th St., Harrison, $75,780; electrical work, to P. H. Jaehing, Inc., 106 Academy St., Newark, $21,445. Grand total $418,147. Noted June 20.

N. J., Jersey City—CHURCH—Murphy & Lehman, archts., 209 Livingston St., Brooklyn, general contract 1 story, basement, brick, steel, plain found., to Deakman Wells Co., 921 Bergen Ave., for Roman Catholic Church of St. Aedans. Est. $400,000. Noted June 6.

N. J., Newark—HOME—J. B. Peterkin, archt., 285 Madison Ave., New York, general contract 2 story, basement, brick, steel, plain found., to Salmond Scrimshaw & Co., 526 Elm St., Arlington, for Florence Crittenden League, Inc., 427 West 21st St., New York. Est. $150,000. Noted June 20.

N. Y., Buffalo—SCHOOL—Denville College, Potter Ave., general contract Holy Angels Academy 60 x 150 ft., to Linwood Constr. Co., 259 Delaware Ave., $193,000. Noted Apr. 11.

N. D., Wahpeton—SCHOOL—Bd. Educ., M. Peschel, clk., general contract 2 story, basement, rein.-con., brick, stone, to Redlinger & Hansen Co., 827 2nd Ave. S., Minneapolis, Minn. and Wahpeton, $116,000. Noted June 6.

Pa., Harrisburg — EDUCATIONAL — State Dpt. Property & Supplies, Capitol Bldg., general contract Educational Building, Capitol Hill, to Nelson & Pedley Constr. Co., 1512 Chestnut St., Phila., $3,430,000; heating and plumbing, to J. T. Evans, Wilkes-Barre, electrical work, to Keystone Eng. Co., Reading, $225,000; elevators, to Otis Elevator Co., 502 North 19th St., Phila., $195,535. Noted July 4.

Pa., Pittsburgh—NURSES HOME—Schmidt, Garden & Erickson, archts., 104 South Michigan Ave., Chicago, Ill., structural steel for brick, concrete, steel, 45th and Calvin Sts., to John L. Mullen Constr. Co., Wabash Bldg., for St. Francis Sisters, 45th St. Total est. $1,250,000. Noted June 13.

Vt., Brandon—TRADES and DORMITORY—State, Commissioner P. Welfare, Montpelier, 2 story, basement, 35 x 125 ft., brick, plain found., at Brandon State School, to H. P. Cumming Constr. Co., 14 Prospect St., Ware.

Wis., Wauwatosa — SCHOOL — St. Anthony Congregation, 68th St. and Cottage Ave., Milwaukee, excavation, concrete, masonry for 2 story, 90 x 135 ft., brick, tile, 77th St., to J. L. Bendowski & Son, 1187 Island Ave., Milwaukee; steel, ornamental iron, to Skobis Co., 951 30th St.; heating, to J. S. Jung, 554 Layton Blvd.

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Que., Montreal—SCHOOL—Roman Catholic School Comn., Holy Family School, to Chauvin & Girard, 134 Darling St., $216,500.

Federal Government Work

Proposed Work

Conn., Newington—HOSPITAL—U. S. Veterans Bureau, Arlington Bldg., Wash., D. C., 2 and 3 story, basement, brick, concrete hospital.

Delaware—DREDGING—U. S. Engineer Office, Wilmington, 98,500 cu.yd. Inland Waterway from Delaware River to Chesapeake Bay.

Massachusetts—DREDGING—U. S. Engineer Office, Boston, 57,161 cu.yd. Dorchester Bay and Neponset River.

Mass., Hingham—POWDER MAGAZINE, etc. Spec. 5814—Bureau Yards & Docks, Navy Dpt., Wash., D. C., withdrew bids to have been opened July 3, powder magazines and roads at Naval Air Depot. Will advertise. Noted June 20.

Pa., Phila. — DREDGING — U. S. Engineer Office rejected bids June 7, in Delaware River at Intersection Bellevue and Cherry Island Ranges. Noted June 27.

Tex., Brownsville — POST OFFICE — Treas. Dpt., at office Supervising Archt., Wash., D. C., post office. I. D. Porter, Dallas, archt.

Tex., Galveston—PUMPS—U. S. Engineer Office, right and one left hand dredging pumps.

Bids Asked

California—ROAD—July 30, by U. S. Bureau P. Rds., 461 Market St., San Francisco, graveling 11.85 mi. San Marcos-Extension Project, Santa Barbara Co. C. H. Sweetser, San Francisco, dist. engr.

Delaware and Maryland—DREDGING—July 27, by U. S. Engineer Office, Wilmington, dredging 100,000 cu.yd. in Reedy Point entrance to Inland Waterway from Delaware River to Chesapeake Bay, Delaware and Maryland; adv. E. N.-R. July 18.

Ill., Aurora — REMODELING — Aug. 9, by Treas. Dpt., at office Supervising Archt., Wash., D. C., remodeling 2nd story and other changes U. S. Post Office.

Ill., Mound City — PAVING — July 25, by U. S. Engineer Office, concrete paving, wing walls, cutoffs on Ohio River Levee.

Ill., North Chicago—HOSPITAL—Aug. 20, by U. S. Veterans Bureau, Arlington Bldg., Wash., D. C., building and utilities, roads, walks for U. S. Veterans Hospital. F. T. Hines, dir.; adv. E. N.-R. July 18.

Ky., Belleview—COTTAGES—July 26, by U. S. Engineer Office, Cincinnati, O., 2 lockkeepers cottages at Dam 38, Ohio River; adv. E. N.-R. July 18.

La., New Orleans—BRIDGES and NEEDLES—July 22, by U. S. Engineer Office, service bridges, needles, Bonnet Carre Spillway; adv. E. N.-R. July 18.

N. Y., Mount Vernon—CHANGES—Aug. 8, by U. S. Treas. Dpt., at office Supervising Archt., Wash., D. C., interior changes, new mailing platform, etc., at U. S. Post Office.

N. Y., St. George—CHAIN—July 22, by Superintendent Lighthouses, 58 pcs. cast steel stud link lightship chain, 230 cast steel shackles for lightship mooring chain, 40 swivels, cast steel for lightship chain.

N. Y., St. George—DREDGING—July 26, by Superintendent Lighthouses, Staten Island, dredging basin at U. S. Lighthouse Depot, to depth 18 ft. below low water.

N. Y., St. George—CHAINS, etc.—Aug. 1, by Superintendent Lighthouses, various wrought iron lightship and buoy mooring chains, buoy bridle chains, buoy shackles, and 5 cast steel mushroom anchors.

O., Toledo—CONCRETE DECK—Aug. 1, by Superintendent Lighthouses, Buffalo, N. Y., repairing concrete deck of Toledo Harbor Lighthouses; adv. E. N.-R. July 18.

Tex., Galveston—JETTY—Aug. 27, by U. S. Engineer Office, Galveston, repairing Sabine Pass, Tex. east jetty; adv. E. N.-R. July 18. Noted July 4.

Utah and Idaho—GATES, etc.—Aug. 16, by Bureau Reclamation, U. S. Dpt. Interior, Denver, Colo., four 18 by 17 ft. radial gates and 5 double-drum radial gate hoists, for Salt Lake Basin Project, Utah; and 5 radial gates, radial gate hoists, accessories for Minidoka Project, Idaho; adv. E. N.-R. July 18.

Bids Received

Colorado — ROAD — U. S. Bureau P. Rds., Custom House, Denver, June 25, grading 3.45 mi. Sect. "B" Willow Creek Pass, Natl. Forest Hy. Project, Grand Co., from Pioneer Constr. & Eng. Corp., Dunham Bldg., Denver, $70,809; 1.1998 Dolores Rico Sect. "C" Natl. Forest Hy. Project, Montezuma Co., from W. A. Colt & Son, Las Animas, $55,534.

Illinois—REVETMENT—U. S. Engineer Office, Custom House, St. Louis, Mo., July 10, 7,000 lin.ft. bank revetment in Mississippi River, at Scudder Towhead, from Woods Bros. Constr. Co., 132 South 13th St., Lincoln, Neb., $215,150. Noted June 28.

Illinois—LEVEE—U. S. Engineer Office, St. Louis, Mo., 135,000 cu.yd. earthwork in South Beardstown Drainage & Levee Dist., from M. H. Anglin, Collinsville, Ill., at $0.1972 per cu.yd. Noted June 13.

La., New Orleans—SPILLWAY—U. S. Engineer Office, foot Prytania St., Bonnet Carré Spillway Structure, left bank Mississippi River, 30 mi. from here, from Stevens Bros., 612 Endicott Bldg., St. Paul, Minn., and Miller & Hutchins, Ocean Springs, Miss., $3,065,957. Est. $3,651,312. Noted June 13.

N. C., Wilmington—PIPING—Treas. Dpt., at office Supervising Archt., Wash., D. C., water piping in U. S. Custom House and Court House, from J. L. Powers, Bennettsville, S. C., $7,157. Noted June 20.

Alaska, Juneau—FEDERAL—Treas. Dpt., at office Supervising Archt., Wash., D. C., United States Federal and Territorial Building, from N. P. Severn, 222 West Adams St., Chicago, Ill., $712,000, for Alaska marble add $25,000. Noted May 2.

Contracts Awarded

Arkansas—LEVEE WORK—U. S. Engineer Office, Vicksburg, Miss., 3,665,000 cu.yd. levee work on south bank Arkansas River, Lincoln and Desha Counties, Items 21, 22, 23 and 26, to Sternberg Dredging Co., Inc., Arcade Bldg., St. Louis, Mo., $517,145; Item 28, to Rogers, Jones & Uzzelle, 625 Front St., Box 5, Memphis, Tenn., $85,200; Items 25 and 27, to Thompson & Moseley, Inc., Memphis, Tenn., $238,500; Item 24, by hired labor. Noted May 23.

Ga., Fort Benning — ROADS — Constructing Quartermaster, curbing, sidewalks, Vibbert Ave. and Lumpkin St., to Davis Constr. Co., Walton Bldg., Atlanta, $94,500. Noted July 4.

Ind., Richmond—REMODELING—Treas. Dpt., at office Supervising Archt., Wash., D. C., remodeling post office, to Dunlop & Co., Columbus, Ind., $21,361. Noted July 11.

Kansas—State Hy. Dpt., Topeka, sand graveling and chats surfacing 31.663 mi. Projects 75-28-5005-A, 75-29-5112 and 75-30-5140 Jackson Co., to Koehler Constr. Co., Sterling, Neb., $23,095—22.461 mi. Projects 4-26-5505, 4-27-5506 and 4-28-5507 Jefferson Co. and 15.076 mi. Project 4-22-5517 A. B. C. Wabaunsee Co., to Western Bridge & Constr. Co., 3867 Leavenworth St., Omaha, Neb., $23,536 and $11,194 respectively—13.624 mi. Projects 30-1-5508, 9 and 10, and 30-3-5511, Jefferson Co., to Collins Constr. Co., Leavenworth, $15,585—7.386 mi. Projects 36-30-5181 and 4.217 mi. Project 75-34-5182, Nemaha Co., to Roberts Constr. Co., 201 Bitting Bldg., Wichita, $2,409 and $1,486 respectively. Grand total $78,305.

New Jersey—DREDGING—U. S. Engineer Office, 30 Whitehall St., New York, 540,700 cu.yd. Passaic River, to Trimont Dredging Co., 10 State St., Boston, Mass., $186,542. Noted June 6.

N. J., Picatinny Arsenal (mail Dover) — STORAGE TANKS—Constructing Quartermaster, two 50,000 gal. water storage tanks, to Pittsburgh Des Moines Steel Co., 50 Church St., New York, $4,990.

S. C., Parris Island—Spec. 5925—REROOFING—Bureau Yards & Docks, Navy Dpt., Wash., D. C., at Marine Base Hospital, to Charleston Sheet Metal & Roofing Wks., 158 Meeting St., $1,144. Noted June 20.

Tenn., Chattanooga—TOW BOAT—U. S. Engineer Office, one 140 ft. steel hull diesel electric driven tow boat, to Marietta Mfg. Co., Point Pleasant, W. Va., $99,250.

Tex., Randolph Field (mail San Antonio)—PIPE — Constructing Quartermaster, installing 3,900 lin.ft. 12 in. and 15,200 lin.ft. 8 in. c.i. water pipe, to Kirkwood Wharton & Lee, 456 Main St., $41,518.

Wash., Puget Sound — ELEVATORS — Spec. 5844 — Bureau Yards & Docks, Navy Dpt., Wash., D. C., converting elevators to automatic control at Navy Yard Hospital, to Otis Elevator Co., 810 18th St. N. W., Wash., D. C., $550 (90 days).

Wyoming—ROAD—Bureau P. Rds., Custom House, Denver, Colo., repairing 0.32 mi. Devils Tower Sect. 1, to Colby, Rogustad & Olson, Inc., Casper, $9,105.

FEDERAL POWER COMMISSION

Application for License and Permits.

993—Zenda Gold Mining Co., 517 I. W. Hellman Bldg., Los Angeles, Calif., wants license transmission line on public lands in San Bernardino Co.

994—Telluride Power Co., Walker Bk. Bldg., Salt Lake City, Utah, wants license transmission line partly within Fishlake Natl. Forest and partly on land in Sevier, Piute, Iron, Beaver and Millard Counties. Originally included in application 814.

995—California Oregon Power Co., 58 Sutter St., San Francisco, Calif., wants license transmission line on public lands in Jackson County, Ore.

Federal Government Work (Continued)

996—D. A. Syme, Phoenix, Ariz., wants license power project on tributary of Showlow Creek within Sitgreaves Natl. Forest in Navajo Co.

997—Eagle River Electric Co., Eagle, Colo., wants license power project on Gypsum Creek within Holy Cross Natl. Forest, Eagle Co.

998—Washington Water Power Co., Spokane, Wash., wants license transmission lines partly on public lands in Grant, Douglas, Chelan and Okanogan Counties.

999—Addison Brown & C. J. York, Downieville, Calif., want license for power project in Slug Canyon and Holloman Ravine, tributaries to North Fork Yuba River, within Tahoe Natl. Forest, Sierra Co.

1000—Louisville Gas & Electric Co., 311 West Chestnut St., Louisville, Ky., wants license transmission line partly within War Dept. reservation in vicinity of U. S. Dam 41, Ohio River, Jefferson Co. Originally included in Project 289.

1001—Mt. Hood Electric Co., 825 Failing Bldg., Portland, Ore., wants license transmission line partly within Mt. Hood Natl. Forest, Clackamas Co.

1002—Southern California Edison Co., 366 West 3rd St., Los Angeles, wants license transmission line partly within Angeles Natl. Forest, Los Angeles Co.

Unclassified

Proposed Work

LIGHTING SYSTEM — Berkeley, Calif. — Electrolier system with underground system in San Pablo Ave. $100,000. F. B. Rae, city engr.

COLISEUM, etc.—Los Angeles, Calif.—City, removing wooden seats, replacing 2,200 concrete seats, raising outside rim coliseum. $900,000. J & D. B. Parkinson, Title Insurance Bldg., archts.

SWIMMING POOLS—Palo Alto, Calif.—Bd. Athletic Control Stanford University, 40 x 75 ft. and 33 x 60 ft., 9 to 12 ft. deep swimming pools. Bakewell & Brown, 251 Kearny St., San Francisco, archts.

SWIMMING POOL—Vallejo, Calif.—Municipal swimming pool. $50,000. T. D. Kilenny, city engr.

MINE BUILDINGS, etc.—Segundo, Colo.—Colorado Fuel & Iron Co., c/o Fuel Dpt., Pueblo, rebuilding mine buildings, machinery, recently destroyed by fire. $160,000.

SUBWAY—Decatur, Ill.—Decatur Twp. et al., Brush College Street Subway, 0.25 mi. long with 25 ft. roadway under railroad tracks. M. F. Longwill, ch. engr. Wabash R.R. Co., Exchange Bldg., St. Louis, Mo., engr.

BOARDWALK — Atlantic City, N. J. — Bd. City Comrs., City Hall, preliminary plans redecking boardwalk from New Jersey to Rhode Island Aves. and from Georgia to Florida Aves. $55,000. J. W. Hackney, city engr.

GAS MAINS—Saddle River, N. J.—Twp. Com., Lincoln School, preliminary plans gas mains, other necessary appurtenances in Scoles Ave, Urmia and Emma Pls., Market, Victor and Sylvan Sts. $25,000. A. Noack, 236 Main St., Hackensack, twp. engr.

TUNNEL—Pittsburgh, Pa.—City soon takes bids repairing Corliss Street Tunnel. $25,000. C. M. Reppert, City-County Bldg., engr.

GRADE CROSSING ELIMINATION—Reading, N. Y.—New York Central R.R. Co., F. B. Freeman, ch. engr., 418 Lexington Ave., New York, eliminating Watkins-Yates County Hy. crossing. $128,000.

GRADE CROSSING ELIMINATION — Van Etten, N. Y. — Lehigh Valley R.R. Co., G. T. Hand, ch. engr., 143 Liberty St., New York, eliminating 4 grade crossings at South Hill and Osborne Rds., Ithaca-Athens Turnpike, Chemung Co. $553,000.

GAS SYSTEM—Colgate, Okla.—North Texas Gas Co., Vernon, Tex., granted franchise natural gas distribution system. $30,000. Private plans.

ELECTRIC DISTRIBUTION SYSTEM—Fairview, Okla.—City preliminary plans rebuilding electric distribution system, installing white way. $30,000.

GAS PIPE LINE, etc.—Texas—Lone Star Gas Co., 1915 Wood St., Dallas and Desdemona, 24 mi. 16 in. gas pipe line from Desdemona to Sipe Springs, $125,000; constructing 2 compressor stations, Gainesville and Sipe Springs, incl. equipment and machinery; 135 mi. 12 in. gas pipe line from Petrolia to Ft. Worth and Dallas; 20 mi. 8 in. gas pipe line from Gainesville to St. Jo and intermediate points. Private plans.

ARENA or STADIUM—College Station, Tex.—A. & M. College, 2 rein.-con. additional units, 27,000 seating capacity, incl. dressing rooms with shower baths, ornamental iron fence around entire stadium. $265,000. College Architectural Dpt., c/o Business Manager, engr.

WHARF—Galveston, Tex.—Galveston Wharf Co., 84 x 232 ft., rein.-con. wharf, concrete pile found. $2,000,000.

GRAIN ELEVATOR—Kingston, Ont.—Canada Steamship Lines, Ft. Bay St., bids in August, grain elevator, 1,300 ft. long, 200 ft. high, 4,000,000 bu. capacity, rein.-con. $2,000,000. C. D. Howe & Co., Whalen Bldg., Port Arthur, engrs. Noted July 11.

Bids Asked

UNDERPASS — Little Rock, Ark. — See "Streets and Roads."

UNDERPASSES—California—July 31, by C. H. Purcell, state hy. engr., P. Wks. Bldg., Sacramento, 2 undergrade crossings under tracks Southern Pacific R.R., one near Spence, Monterey Co., other near Califa.

SWIMMING POOL, etc.—Miami Beach, Fla.—Fisher Properties bids about Aug. 1, 40 x 120 ft. swimming pool, bath house, bridge, cafeteria, island west of Nautalis Hotel. $90,000. Noted Apr. 18.

BLEACHERS — East Boston (sta. Boston), **Mass.**—July 25, by Park Dpt., 33 Beacon St., Boston, concrete bleachers at American Legion Playground. $25,000 or more.

PLAYGROUND, etc.—Brooklyn, N. Y.—July 23, by W. R. Herrick, pres. Park Comn., The Arsenal, Central Park, New York, 1st addition Lincoln Terrace Playground, Rochester, Buffalo Aves., President, Carrol Sts.; improving Ocean Parkway East Traffic Rd.; Prospect Park S.W., Gravesend Park, resurfacing tennis courts in Sunset Park.

REFRIGERATION—Kings Park, N. Y.—Aug. 14, by Dpt. Mental Hygiene, Capitol, Albany, refrigeration work, laboratory, mortuary, Kings Park State Hospital; adv. E. N.-R. July 18.

PIER SHED—New York, N. Y.—July 25, by M. Cosgrove, comr. Docks, Pier A foot Battery Pl. North River, pier and bulkhead sheds, for Pier 3, Morris St., North River.

STEEL CARS, etc.—New York, N. Y.—Aug. 2, by J. H. Delaney, chn. Bd. Transportation, 49 Lafayette St., 300 steel passenger cars, 5 motor trucks, 5 trailer trucks.

TENSION FEEDER SYSTEM—New York N. Y.—July 22, by A. Goldman, comr. Plant & Structures, Municipal Bldg., complete high and low tension feeder system on Queensboro Bridge.

COMFORT STATION, TENNIS HOUSE—New York, N. Y.—July 24, by W. R. Herrick, pres. Park Comn., The Arsenal, Central Park, erecting, completing comfort station, tennis house, Central Park.

SANITARY WORK, etc.—Ossining, N. Y.—Aug. 13, by Commissioner Dpt. Correction, Albany, sanitary work in cell blocks "A" and "B," Sing Sing Prison; adv. E. N.-R. July 18.

GRADE SEPARATION—Ohio—See "Streets and Roads."

FERRY LANDINGS—Galveston, Tex.—Aug. 6, by Galveston Co., c/o I. Predecki, aud., ferry landing at 9th St., incl. 6,600 cu.yd. dredging, etc., and landing on Galveston Island and Port Bolivar, incl. 147,000 cu.yd. dredging, $79,000. Former bids rejected. C. C. Washington, Galveston, engr. Noted Nov. 22.

TURBINE, GENERATORS, TRANSFORMERS, etc.—Centralia, Wash.—Aug. 13, by City Council, two 2,900 hp. hydraulic turbines, two 2,500 kva. electric generators, eight 167 kva. transformers, for electric plant. $1,000,000. W. J. Roberts, ch. engr. D. Dunbar electrical engr.

LIGHTING SYSTEM—Toronto, Ont.—See "Contracts Awarded."

Bids Received

SUBWAY—Brooklyn, N. Y.—Bd. Transportation, J. H. Delaney, chn., 49 Lafayette St., New York, July 12, constructing Route 107, Sect. 6, Rapid Transit R.R. along and under Schermerhorn St. and Lafayette Ave. between St. Felix and Bond Sts., from Del Balso Constr. Co., 900 Zerega Ave., New York, $4,654,052.

Contracts Awarded

UNDERPASS—Enterprise, Ala.—See "Streets and Roads under Alabama."

STAGE—Los Angeles, Calif.—Warner Bros. Studios, Inc., 5824 Sunset Blvd., 2 story, 150 x 200 ft. timber, rein.-con. motion picture stage, Sunset Blvd. $60,000. Owner builds. Private plans.

STEEL ROLLING DOORS — San Francisco, Calif. — State Harbor Comn., Ferry Bldg., steel rolling doors for Pier 48, to Kennerson Mfg. Co., 447 Hampshire St., $29,408. Noted May 23.

SWIMMING POOL—Lexington (br. Boston), **Mass.**—Town, Bd. Selectmen, concrete swimming pools, Centre and Parker Field Playgrounds, to Hill & Delaney, 108 Mass. Ave., Boston. Est. $25,000.

CAR BARN — Jackson, Miss. — Mississippi Power & Light Co., brick, frame car barn, to Currie & Corley, Raleigh, $41,630 plumbing, to Davis Plumbing Co., 115 South State St., $945; electrical work, to Koenenan Electric Co., Jackson, $550. Grand total $43,125.

ROLLER COASTER—St. Louis, Mo.—G. M. Sauter, P. O. Box 646, c/o Manions Park, 8614 South Bway., timber, steel roller coaster, concrete foundation piers for amusement park, to M. E. Shoemaker, 8614 South Bway. Est. $28,000.

STATION PLATFORM — St. Louis, Mo. — Terminal Railroad Assn., Union Station, 1800 Market St., rein.-con. addition to passenger station platform 1900-2000 Market St., to Dwight P. Robinson & Co., Inc., 125 East 46th St., New York. Est. $185,000.

ATHLETIC FIELD—Cliffside Park, N. J.—Bd. Boro Council, Boro Hall, athletic field, incl. grading, retaining walls, running tracks, to Coppoletta Bros., Inc., 452 Palisade Ave., $60,885. Noted May 16.

BULKHEAD, etc.—Red Bank, N. J.—Bd. Boro Council, Boro Hall, timber, sheet steel bulkhead and stone jetties, to J. A. Howland, Washington Ave., Rumson, $161,582.

GRADE CROSSING ELIMINATION — Buffalo, N. Y. — New York Central R.R. Co., F. B. Freeman, ch. engr., 416 Lexington Ave., New York, temporary foot bridge in connection with grade crossing eliminations at Amherst, Austin, Tonawanda Sts., to J. Johnson Constr. Co., 765 Abbott Rd., $16,715.

GRADE CROSSING ELIMINATION — Cowsackie, N. Y. — New York Central R.R. Co., F. B. Freeman, ch. engr., 416 Lexington Ave., New York, eliminating grade crossing at Mansion St., Green Co., to Bates & Rogers Constr. Co., 37 West Van Buren St., Chicago, Ill., $93,366. Est. $128,385.

HEATING, etc.—Odgensburg, N. Y.—Commissioner Dpt. Mental Hygiene, Capitol, Albany, service connections for tuberculosis pavilion, reception hospital, and nurses home at St. Lawrence State Hospital, to J. F. Skelley, 303 Catherine St., Odgensburg, $59,487. Noted June 13.

GRADE CROSSING ELIMINATION—Salina, N. Y. — New York Central R.R. Co., F. B. Freeman, ch. engr., 416 Lexington Ave., New York, bridge over Syracuse-Cicero State Hy. 5470, Onondaga Co., to Walsh Constr. Co., Herald Bldg., Syracuse, $92,112.

CULVERTS—Le Mars, Okla.—See "Streets and Roads."

DOCK—Linnton, Ore.—See "Buildings—Industrial."

COKE OVENS, etc.—Aliquippa, Pa.—Jones & Laughlin Steel Co., 311 Ross St., Pittsburgh, general contract 81 coke ovens, coke handling, boiler house extensions to Koppers Co., Koppers Bldg., Pittsburgh.

SWIMMING POOL — Phila., Pa. — Dpt. P. Wks., Bureau Recreation, general contract 40 x 120 ft., rein.-con. swimming pool, Tacony and Levick Sts., to Mason & Cullen, Ardmore, $6,630. Noted July 4.

LIGHTING SYSTEM—Toronto, Ont.—Toronto Hydro Electric System, 225 Yonge St., lighting system, incl. conductors, insulators, conduit, meters, cross arms, poles, day labor, $950,000. Private plans.

Materials

Bids Asked

PAINT—New Jersey—July 22, by State Hy. Comn., Trenton, 1,000 gal. ready mixed white lead paint; 500 gal. ready mixed red lead paint; 500 gal. ready mixed black graphite paint. A. L. Grover, ch. clk.; adv. E. N.-R. July 18.

LUMBER—Atlantic City, N. J.—July 25, by Bd. City Comrs., City Hall, 225,000 ft. edge grain boardwalk decking, long leaf yellow pine or western hemlock surfaced, also 262,640 ft. Douglas fir joists, and spiking pieces, rough. J. W. Hackney, city engr.

FIRE HYDRANTS, CABLE, etc.—Cleveland, O.—July 19, City, fire hydrants, lead covered cable and fibre conduit.

CONTRACT RAIL—Phila., Pa.—July 23, by Dpt. City Transit, C. E. Myers, dir., City Hall Annex, 60 Gross tons 150 lb. contact rail, Contr. 222, for Broad Street Subway.

Contracts Awarded

CEMENT—Sacramento, Calif.—State, 60,000 bbl. cement for State Harbor Commission, and 30,000 bbl. for various institutions, to Henry Cowell Lime & Cement Co., 2 Market St., San Francisco, at $2.34 and $2.46 per bbl. respectively.

ROAD OIL—Kansas City, Mo.—Comrs. Jackson Co., 3 m.g. road oil, to P. Paton, 1921 Woodland Ave., at $0.65 per gal.

STREET SIGN FRAMES, etc.—New York, N. Y.—H. Bruckner, pres. Bronx Boro, Crotona Park, 3rd and Tremont Aves., to Cavanaugh Bros., 300 c.i. street sign frames $3,489; to Ames Building Material Co., 3441 Kingsbridge Ave., 1,000 cu.yd. paving sand $1,900, 5,000 bags cement $3,063, 3,000 cu.yd. sand grit $8,700; to Warner Quinlan Co., 79 Wall St., 150,000 gal. asphaltic cement $6,840; to Barrett Co., 17 Battery Pl., 100 tons pitch joint filler $2,300. Grand total $26,292. Noted July 4.

Foreign

Mexico—Owner, c/o W. H. Wheeler & G. E. Mayer, assoc. archts., Bancroft Bldg., San Diego, Calif., plans casino, bathhouses, hotel, swimming pool, golf course, at Aqua Caliente, $3,000,000 or more.

See proposal advertising on page 130

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UNIT PRICES

Substructure for Pumping Plant—Detroit, Mich.

Department of Water Supply opened bids May 29 substructure for low lift pumping plant at Springwells Station Contract PC-41. Eight bids were received, difference between lowest and average 36 per cent. Will consist of two reinforced-concrete vertical cylinders, one placed inside the other. Space between two cylinders will be used for both surge chamber and pump discharges. Ten vertical shaft centrifugal pumps driven by electric motors will be installed. Gross pump capacity 435 M.G.D. Outside diameter of outer cylinder approximately 90 ft.; inside diameter of plant 58 ft. 8 in.; depth from top to bottom of plant 100 ft. Contractor proposes to sink 60 ft. of outer cylinder as caisson and after this is completed, inner cylinder and upper part of outer cylinder will be completed by means of forms and bracing as all of this part of work will be in the open. In conjunction with plant, three shafts will be constructed adjacent to outer cylinder, which will be used for electric elevator, pipe service shaft, air ducts and electric cables. Bidders are: (A) E. H. Latham Co., 447 Neilston St., Columbus, O., (awarded contract); (B) Spencer, White & Prentiss; (C) A. Phelps & Sons; (D) Foundation Co.; (E) Dravo Contracting Co.; (F) R. A. Mercier; (G) Mark R. Hanna Co.; (H) G. R. Cooke Co. G. H. Fenkell, general manager and chief engineer. W. C. Rudd, assistant engineer—power.

	A	B	C	D	E	F	G	H
15,000 cu.yd. excav. class 1 (including sheeting and bracing)	$4.50	$2.70	$8.50	$3.50	$6.50	$10.30	$15.00	$11.00
4,000 cu.yd. excav. class 2 (including sheeting and bracing)	4.55	12.00	9.50	10.00	8.50	12.70	20.00	16.00
1,000 cu.yd. backfilling	1.00	1.00	.50	.80	.75	2.50	2.00	3.00
16,000 cu.yd. conc. including forms	12.00	15.00	13.35	19.60	20.50	22.50	20.00	28.00
1,100,000 lb. reinforcing steel	.04	.04	.04	.05	.05½	.07	.06	.06
250 bbl. cement grout	4.00	8.00	5.00	16.50	10.00	6.00	6.00	20.00
70,000 sq.ft. damproofing of conc. surfaces	.02½	.05	.03	.07	.03	.08½	.06	.05
Floor drains	200.00	200.00	300.00	103.00	300.00	1,150.00	350.00	300.05
8,000 sq.ft. steel floor gratings	1.25	2.00	.80	1.25	1.50	1.85	2.00	1.50
370,000 lb. structural steel	.04	.05½	.04½	.05	.08	.05½	.10	.06
24,000 lb. miscellaneous steel	.05	.10	.06	.10	.10	.16	.15	.12
Metal casting and cast iron pipe	14,000.00	9,000.00	7,100.00	13,800.00	16,200.00	23,025.00	33,000.00	15,000.00
Valves and steel pipe	152.00	500.00	500.00	750.00	3,500.00	1,500.00	1,100.10	1,500.00
Sluice gates	1,311.00	4,000.00	6,000.00	1,650.00	2,500.00	3,000.00	10,000.00	8,150.00
1,500 lin.ft. caissons	17.00	18.00	8.00	15.50	35.00	25.00	20.00	27.00
Miscellaneous work	2,306.00	3,000.00	1,000.00	2,000.00	4,500.00	4,500.00	4,000.00	4,000.00
Engineer's field office	7,500.00	8,000.00	15,000.00	9,000.00	5,000.00	7,000.00	6,000.00	10,000.00
Cleaning up	1,000.00	2,000.00	500.00	1,130.00	6,000.00	3,000.00	2,000.00	5,000.00
Total estimated cost as computed by engineer from itemized bids	**$403,419**	**$471,450**	**$493,840**	**$553,508**	**$657,100**	**$771,915**	**$841,750**	**$876,030**
Total estimated cost by bidder	**$403,969**	**$471,450**	**$493,840**	**$553,508**	**$657,100**	**$769,527**	**$841,750**	**$876,030**

Method of construction by bidders:

A. Outside shell as open caisson with steel cutting shoe and open cut to elevation 93.5 ft.
B. Main portion by sinking caisson elevator shafts in cofferdam.
C. Outside shell as an open caisson 8,000 lb. of copper construction joints included in bid. 40c. per lb. to be paid for any amount over 8,000 lb.
D. Outside shell as open caisson. Elevator shafts in cofferdam.
E. Open caisson method.
F. Outside ring as caisson concrete to be poured in segments.
G. Same method of construction as used on shore shaft. (Caisson.)
H. (not given)

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Foundations for Bridge Plaza—Washington, D. C.

Arlington Memorial Bridge Commission, Navy Bldg., opened bids Apr. 17, foundations for bridge plaza and water gate for Arlington Memorial Bridge. Nine bids were submitted, difference between lowest and average 17 per cent. Approximate quantities in lump sum bids are: 11,376 lin.ft. wood piles, 25,165 lin.ft. conc. piles, 3,220 cu.yd. conc. for foundation piers, 2,032 cu.yd. conc. for footings, base slabs, etc., 345,750 lb. reinforcing steel. Contract has been let to Grier-Lawrence Co., Statesville, N.C. List of bidders, together with their bids, are given below.

Bidders	Main Bid	Time Days	Additional Work A	B	C	D	E	F	G	H	I
Grier-Lawrance Construction Co., Statesville, N. C.	$328,700	180	$1.25	$3.00	$4.00	$5.00	$18.50	$50.50	$19.00	$.05	$1.50
George Hyman Construction Co., 1010 Vermont Ave., N. W., Washington, D. C	371,000	180	1.00	2.90	3.70	4.75	20.00	25.00	22.00	.06	7.00
Triest & Earle, Inc., 1128 Real Estate Trust Bldg., Philadelphia, Penn.	371,890	200	.60	3.00	4.00	5.00	20.00	60.00	25.00	.05	.70
Tuller Construction Co., 95 Monmouth St., Red Bank, N. J.	376,100	175	1.50	3.00	3.69	4.00	20.00	25.00	30.00	.06	.90
Hunkin-Conkey Construction Co., East 12th and Walnut Ave., Cleveland, O.	391,775	200	.86	3.43	3.85	4.23	51.92	55.85	41.80	.045	.93
Sanford & Brooks, Inc., South and Water Sts., Baltimore, Md	406,400	180	1.10	2.75	3.75	4.25	60.00	48.00	18.00	.06	1.00
The Cranford Co., 3056 K St., N. W., Washington, D. C.	417,000	200	.90	3.00	3.70	4.50	40.00	45.00	25.00	.05½	.75
Merritt-Chapman & Scott Corp., 17 Battery Pl., New York City	425,000	200	.65	3.20	4.25	5.20	12.00	35.00	18.00	.05½	.75
Frederick Snare Corp., 114 Liberty St., New York City	484,138	180	.68	2.34	3.32	3.65	60.00	95.10	19.40	.044	.77

Additional Work:

A Wood piles per lin. ft.
B 15-in. concrete piles per lin. ft.
C 18-in. concrete piles per lin.ft.
D 20-in. concrete piles per lin.ft.

Class B concrete
E Foundation piers per cu.yd.
F Cylinders per cu.yd.
G Base beams, footings, etc. per cu.yd.
H Reinforcing steel in place per lb.
I Trenching per cu.yd.

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